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DISABLING MORBIDITY AMONG INDUSTRIAL WORKERS, THIRD QUARTER AND THE FIRST 9 MONTHS OF 1939[1]

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The data on the frequency of sickness and nonindustrial injuries lasting 8 consecutive calendar days or longer during the third quarter and the first 9 months of 1938 and 1939, presented in table 1, are derived from analyses of reports from 26 sick benefit organizations representing approximately 170,000 members in industrial establishments located east of the Mississippi River and north of the Ohio and Potomac Rivers. While the rates for the third quarter and the first 9 months of 1938 and 1939, respectively, are determined for the same 26 organizations, the rates for the first 9 months of the quinquennium, 1934–38, are based on some additional reporting organizations.

THIRD QUARTER OF 1939

A comparison of the rates for the third quarter of 1939 and 1938 reveals only minor differences in the broad cause groups of respiratory diseases, digestive diseases, and nonrespiratory-nondigestive diseases. Of interest, however, are decreases of 20 percent for diseases of the pharynx and tonsils, and for diseases of the stomach, except cancer, the rates for 1939 and 1938, respectively, for both these groups of diseases being the same. Of interest also is an increase of almost 25 percent in the frequency of appendicitis.

DISEASES OF THE SKIN, 1930–39

Attention is also directed to diseases of the skin[2] which show a slight decrease for the third quarter of 1939 as compared with the corresponding quarter of 1938. The recognition of this more or less favorable rate raises the question of its magnitude in relation to previous years. Data, by quarters, for the years 1930 to 1939, obtained from earlier reports of this series and from table 1, are given

[1] From the Division of Industrial Hygiene, National Institute of Health.
For the second quarter of 1939, see PUBLIC HEALTH REPORTS for October 20, 1939 (54: 1878–1880).
[2] International List, 151–153. These titles do not include sunburn, poisoning by organic substances, or the mycoses.

TABLE 1.—*Frequency of cases of sickness and nonindustrial injuries lasting 8 consecutive calendar days or longer among* MALE *employees in various industries, by cause, the third quarter of 1939 compared with the third quarter of 1938, and the first 9 months of 1939 compared with the first 9 months of 1938 and 1934–38, inclusive* [1]

[Male morbidity experience of industrial companies which reported their cases to the United States Public Health Service]

Cause (numbers in parentheses are disease title numbers from the International List of the Causes of Death, 1929)	Annual number of cases per 1,000 males				
	Third quarter		First 9 months		
	1939	1938	1939	1938	1934-38
Sickness and nonindustrial injuries [2]	68.4	71.1	92.2	82.5	89.5
Nonindustrial injuries (163-198)	11.1	12.1	10.2	11.1	11.5
Sickness [2]	57.3	59.0	82.0	71.4	78.0
Respiratory diseases	14.1	16.8	36.3	26.1	31.8
Influenza and grippe (11)	3.9	4.4	18.7	9.5	14.6
Bronchitis, acute and chronic (106)	2.2	2.6	4.0	4.0	4.1
Diseases of the pharynx and tonsils (115a)	3.2	4.0	4.7	4.8	5.0
Pneumonia, all forms (107-109)	1.1	1.3	3.0	2.1	2.4
Tuberculosis of the respiratory system (23)	.5	.9	.7	1.0	.9
Other respiratory diseases (104, 105, 110-114)	3.2	3.6	5.2	4.7	4.8
Nonrespiratory diseases	41.1	39.7	43.5	43.2	43.7
Digestive diseases	14.0	13.2	13.9	13.5	13.7
Diseases of the stomach, except cancer (117, 118)	3.2	4.0	3.5	4.1	3.8
Diarrhea and enteritis (120)	1.5	1.3	1.2	.9	1.3
Appendicitis (121)	4.8	3.9	4.5	4.2	4.3
Hernia (122a)	1.5	1.5	1.6	1.7	1.6
Other digestive diseases (115b, 116, 122b-129)	3.0	2.5	3.1	2.6	2.7
Nondigestive diseases	27.1	26.5	29.6	29.7	30.0
Diseases of the heart and arteries, and nephritis (90-99, 102, 130-132)	3.5	3.6	4.3	4.1	3.9
Other genitourinary diseases (133-138)	2.5	2.3	2.3	2.4	2.4
Neuralgia, neuritis, sciatica (87a)	2.1	1.8	2.2	2.1	2.2
Neurasthenia and the like (part of 87b)	.8	.8	.9	.9	1.0
Other diseases of the nervous system (78-85, part of 87b)	1.1	1.2	1.1	1.2	1.2
Rheumatism, acute and chronic (56, 57)	2.5	3.1	3.6	3.8	4.2
Diseases of the organs of locomotion, except diseases of the joints (156b)	2.3	2.4	2.6	2.7	2.9
Diseases of the skin (151-153)	3.4	3.7	2.8	3.1	2.9
Infectious and parasitic diseases (1-10, 12-22, 24-33, 36-44)	1.8	1.5	2.4	2.3	2.7
All other diseases (45-55, 58-77, 88, 89, 100, 101, 103, 154-156a, 157, 162)	7.1	6.1	7.4	7.1	6.6
Ill-defined and unknown causes (200)	2.1	2.5	2.2	2.1	2.5
Average number of males covered in the record	175,584	165,073	172,156	167,922	160,245
Number of organizations	26	26	26	26	------

[1] In 1939 and 1938 the same organizations are included; the rates for the first 9 months of the years 1934-38, however, are based on records from the same 26 organizations and some additional reporting organizations.
[2] Exclusive of disability from the venereal diseases and a few numerically unimportant causes of disability.

TABLE 2.—*Frequency of disabling cases of skin diseases* [1] *lasting 8 consecutive calendar days or longer among* MALE *employees in various industries, by quarter years, 1930 to 1939, inclusive*

Year	Annual number of cases per 1,000 males			
	First quarter	Second quarter	Third quarter	Fourth quarter
1930	3.6	3.9	4.4	3.7
1931	2.7	3.3	3.8	3.1
1932	2.3	2.8	3.4	2.6
1933	2.5	1.9	3.5	2.7
1934	2.3	2.2	3.3	2.4
1935	2.4	2.2	3.5	2.7
1936	2.4	2.4	3.8	3.3
1937	3.1	2.9	3.4	3.1
1938	3.0	2.7	3.7	2.5
1939	2.7	2.2	3.4	------
Mean, 1930-39	2.7	2.7	3.6	2.9

[1] Includes furuncle, carbuncle; phlegmon, acute abscess; and other diseases of the skin and annexa, and of the cellular tissue (titles 151-153 of the International List of Causes of Death, 1929).

in table 2 and are shown graphically in figure 1. The frequency of diseases of the skin over this 10-year period is of considerable interest. Perhaps most outstanding is the fact that for each of these years the rate for the third quarter is the highest of all quarter rates. This is particularly striking when it is considered that a time curve representing total disabilities is generally lowest in the third quarter, and that the definition of "diseases of the skin" does not include sunburn, poisoning by organic substances, or the mycoses. It will be observed, furthermore, that while the mean (3.6) of the 10 third-quarter rates is the highest of the four means representing the four sets of quarters, the stability of the third-quarter rates is greatest, varying, as they do, in the relatively narrow zone of 3.3 (1934) to 4.4 (1930).

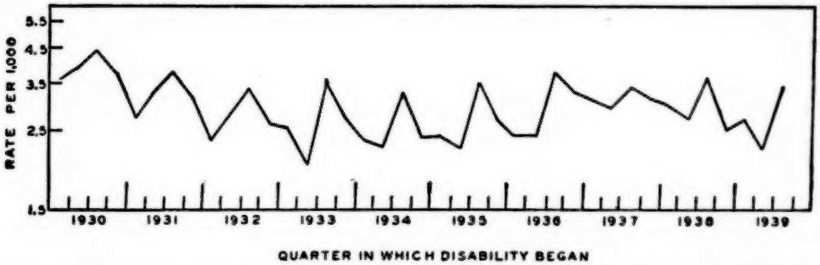

FIGURE 1.—Frequency (logarithmic) of disability lasting 8 consecutive calendar days or longer caused by diseases of the skin, by quarter-year of onset, 1930–39, inclusive. Diseases of the skin (titles 151–153 of the International List of Causes of Death, 1929) includes furuncle, carbuncle; phlegmon, acute abscess; and other diseases of the skin and annexa, and of the cellular tissue. This definition does not include sunburn, poisoning by organic substances, or the mycoses. (Male morbidity experience of industrial companies which reported their cases to the United States Public Health Service.)

FIRST 9 MONTHS OF 1939

An inspection of the frequencies of sickness and nonindustrial injuries for the first 9 months of 1939 and 1938 in the light of the experience recorded for the third quarters of the same years reveals that the unfavorable sickness rate for 1939 is due principally to the excessive rate for influenza and grippe previously referred to in the summaries for the first and second quarters of the year.

MORTALITY RATES AND ECONOMIC STATUS IN RURAL AREAS[1]

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It has been believed for some time that health and economic status are directly related. Such data as exist indicate that both morbidity

[1] The tabulation of these data was made possible by the support and cooperation of the Scripps Foundation for the Study of Population Problems. Mr. I. C. Plummer, Chief, Division of Vital Statistics of the State Department of Health of Ohio, not only gave access to the original records, but also made available the facilities of his office during the tabulation of the data. This material was taken from a thesis submitted to the faculty of the Graduate School of the University of Wisconsin in partial fulfillment of the requirements for a Degree of Doctor of Philosophy.

and mortality rates are generally higher among the poor than among the well-to-do, although some deviation from this occurs when specific causes of illness or death are considered. With very few exceptions, however, the available information refers solely to village or city residents. Almost no data concerning the relationship of health and economic status of rural residents in the United States are available.

During the course of a study of differential rural-urban mortality in Ohio in 1930, it proved feasible to tabulate the data for the rural population by an approximate index of economic status. It is the purpose of this paper to discuss the differences in the mortality rates of rural people living in counties of varying agricultural productivity.

The rural population of Ohio is far from homogeneous. In the northeastern part of the State and around the large industrial cities the rural population is mainly nonfarm, as defined by the census, and seeks a livelihood in the adjacent cities. This nonfarm element of the rural population is supplemented by miners in the eastern and southern part of the State. The farm population falls into two fairly well-defined groups. North of the Ohio River is an area of marginal agricultural land, while northwestern Ohio lies adjacent to the corn belt, a productive agricultural section.

Since the mortality records did not record information which could be used in accurately subdividing the rural population by economic status, the counties were arranged in groups on the basis of census data and with the advice of members of the Department of Rural Economics of Ohio State University. Counties with a large proportion of rural-farm population were subclassified as having good, fair, and poor agriculture; counties with a large proportion of rural nonfarm population were subclassified as industrial or mining; a third group included with the rural-nonfarm counties was classed as mixed farm and nonfarm, since neither element of the population was predominant.

The mortality records for 1930 were then tabulated on the basis of this grouping of the counties of the State. All nonresident deaths were allocated to the place of residence. The data used throughout this paper refer to the native white population.

Tables 1 and 2 present the number of resident deaths per 1,000 population by age and sex for the rural native white population of the various groups of counties in Ohio for 1930. In the counties in which the rural population is mainly nonfarm, the mortality rates are, as a whole, lowest in the industrial and highest in the mining counties. This difference is less marked among females than among males. The largest differential exists at the younger ages; after age 55 the rates in the mining counties are no greater on the whole and, indeed,

are slightly less than the corresponding rates in the other nonfarm counties.

TABLE 1.—*Death rates per 1,000 population for native white* MALES *in different types of rural communities, Ohio, 1930*

Age	Total rural	Rural-farm				Rural-nonfarm			
		Total	Good agriculture	Fair agriculture	Poor agriculture	Total	Mining	Industrial	Mixed farm and nonfarm
Under 5	16.5	16.8	14.4	14.8	21.6	17.3	22.5	13.3	18.6
5-9	1.9	1.8	1.6	1.9	1.8	1.9	1.4	2.0	2.0
10-14	1.4	1.5	1.6	1.0	2.1	1.4	.9	1.6	1.4
15-19	2.2	1.6	1.1	1.8	1.7	2.7	2.9	2.5	2.8
20-24	3.6	3.6	3.1	3.7	3.9	3.6	5.5	2.8	4.1
25-29	3.7	4.0	3.2	3.9	4.6	3.4	5.0	3.0	3.5
30-34	3.4	3.3	1.5	4.3	3.0	3.5	5.4	2.6	4.4
35-44	4.9	4.5	3.6	4.7	4.8	5.2	9.4	4.6	4.6
45-54	7.6	7.2	6.9	7.6	6.9	7.8	9.6	7.8	7.2
55-64	16.8	16.6	15.9	17.9	15.1	17.0	17.4	17.6	16.3
65-74	43.8	43.8	42.6	44.4	43.7	43.9	42.3	47.2	40.2
75+	117.8	118.0	128.2	113.6	117.7	117.6	132.0	114.3	116.6
All ages	11.0	11.7	11.0	11.7	12.3	10.4	11.8	9.5	11.2
Adjusted rate [1]	8.7	8.6	7.9	8.5	9.2	9.0	10.7	8.3	8.9

[1] These and subsequent adjusted rates are based on the age distribution of the standard million population of England and Wales, 1901.

TABLE 2.—*Death rates per 1,000 population for native white* FEMALES *in different types of rural communities, Ohio, 1930*

Age	Total rural	Rural-farm				Rural-nonfarm			
		Total	Good agriculture	Fair agriculture	Poor agriculture	Total	Mining	Industrial	Mixed farm and nonfarm
Under 5	13.8	14.0	12.9	13.0	16.4	13.7	19.0	10.7	16.3
5-9	1.5	1.7	1.1	1.9	1.6	1.4	1.5	1.2	1.6
10-14	1.3	1.3	.3	1.4	1.8	1.4	1.2	1.2	1.6
15-19	2.1	1.8	1.3	1.7	2.5	2.2	1.9	1.9	2.9
20-24	3.4	3.1	3.8	2.6	3.5	3.5	3.5	3.4	3.9
25-29	3.6	3.7	3.7	2.9	5.0	3.5	2.8	3.3	4.3
30-34	3.8	4.3	4.0	3.5	5.9	3.4	3.6	3.2	3.8
35-44	4.7	4.5	4.7	4.3	4.9	4.8	5.8	4.6	4.8
45-54	8.0	7.5	8.4	7.8	6.3	8.6	9.5	8.1	9.0
55-64	16.6	16.2	15.7	17.2	14.8	17.0	14.8	18.9	15.1
65-74	40.3	39.5	39.5	40.7	37.7	41.2	36.5	42.8	40.9
75+	121.7	110.1	121.1	123.0	115.1	123.5	107.9	132.1	119.0
All ages	10.5	11.1	10.6	11.1	11.7	9.9	9.8	9.2	11.1
Adjusted rate	8.3	8.0	8.0	8.1	8.6	8.4	8.6	8.1	8.8

These differences are in general agreement with what one would expect. In addition to the occupational hazards of mining, the population of these counties is, as a rule, further removed from adequate health and medical facilities and services than is the population in the industrial counties. That occupational hazards are important, however, is indicated by the fact that the difference in mortality rates is greater for males than it is for females.

In the counties in which the rural population is engaged mainly in farming, there is a negative correlation between the mortality

rate and agricultural productivity; that is, the death rate is lowest in the best agricultural areas. The largest differences are in the younger age groups; after age 45 the rates in the poor agricultural regions are no greater, and are even somewhat smaller than in the better farming counties.

The classification used in tables 1 and 2 is too detailed for comparison of specific causes of death. For this purpose the counties have been combined into two groups, one composed of counties in the poor agricultural and mining areas and representing relatively poor economic status, and another composed of the remainder of the counties representing relatively good economic status. Table 3 presents the mortality rates for these two groups.

TABLE 3.—*Death rates per 1,000 native white population by age and sex in different types of rural communities, Ohio, 1930*

Age	Male		Female		Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status		Good economic status	Poor economic status	Good economic status	Poor economic status
Under 5	14.0	20.5	11.8	16.9	35-44	4.4	5.6	4.5	5.0
5-9	1.9	1.8	1.4	1.6	45-54	7.6	7.5	6.7	8.1
10-14	1.4	1.5	1.1	1.6	55-64	17.4	15.9	17.6	14.9
15-19	2.0	2.4	1.7	2.6	65-74	45.1	41.9	41.3	38.9
20-24	3.2	4.3	3.2	3.7	75+	116.7	119.4	126.1	115.6
25-29	3.4	4.2	3.2	4.2	All ages	10.5	11.7	10.1	11.0
30-34	3.0	4.1	3.4	4.5	Adjusted rate	8.3	9.3	7.9	8.7

On the average, the death rates in the areas of poor economic status are about 10 percent greater than the corresponding rates in the areas of good economic status when adjustments are made for differences in age distribution of the populations involved. After age 55, however, the differential is reversed and the rates are higher in the good economic regions, except for males over 75 years of age.

That the death rate is greater in regions of poor economic status is not surprising. In such areas the wealth necessary to provide adequate health and medical facilities is usually lacking, standards of living are lower, and public health services are regarded as luxuries rather than necessities. It is interesting to observe that in the older age groups there is a fairly clear-cut tendency for mortality rates to be lower in the regions of poor economic conditions. It may be, as some have suggested, that under favorable health conditions a significant proportion of weaklings survive through adolescence and early adult life only to die at increasing rates when the diseases of late adult life begin to take their toll.

If differences in medical and health facilities and services play a part in bringing about the difference in mortality between persons living in counties with good economic conditions and those living in

counties with poor economic conditions, then the differences would be expected to be especially noticeable for diseases which are most easily prevented or cured. One such group of diseases comprises those associated with infant deaths. The data in table 4 show that the infant mortality rate is more than 40 percent greater in the poor economic areas. Although this is especially true for deaths due to diarrhea, enteritis, and the principal contagious diseases of childhood, it also exists for every cause except congenital malformations. The extremely high death rates from the principal contagious diseases and diarrhea and enteritis prevail throughout the entire first 5 years of life, with the rates in the regions of poor economic status between two and three times as large as the corresponding rates in the better economic areas (tables 5 and 6).

TABLE 4.—*White* INFANT DEATHS *and deaths per 1,000 live white births for selected causes of death in different types of rural communities, Ohio, 1930*

Cause of death	Rates		Deaths	
	Good economic status	Poor economic status	Good economic status	Poor economic status
Whooping cough, measles, scarlet fever, diphtheria	1.3	4.2	29	61
Influenza and pneumonia	7.9	11.6	177	170
Syphilis and gonorrhea	.4	.9	10	13
Diarrhea and enteritis	5.2	11.4	117	167
Congenital malformations	7.0	6.0	158	88
Premature birth	14.4	18.2	322	266
Birth injury	3.5	4.7	79	69
Accidents	1.3	3.3	29	49
Other causes	11.1	14.2	249	208
Total	52.2	74.5	1,170	1,091

TABLE 5.—*Death rates per 100,000 native white population by age and sex from* CHILDREN'S DISEASES [1] *in different types of rural communities, Ohio, 1930*

Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status
Under 5	59	172	59	134
5 and over	4	7	6	6
All ages	9	23	12	19

[1] Measles, whooping cough, scarlet fever, diphtheria.

TABLE 6.—*Death rates per 100,000 native white population by age and sex from* DIARRHEA AND ENTERITIS, *in different types of rural communities, Ohio, 1930*

Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status
Under 5	169	326	139	315
5 and over	4	6	4	8
All ages	20	38	17	40

In keeping with the differences observed in the death rates from all causes, the mortality from tuberculosis, influenza, pneumonia, and accidents is consistently greater in the poor economic regions during childhood, adolescence, and early adult life, but at advanced ages the differences are not so clear-cut (tables 7, 8, and 9). For females the mortality from tuberculosis is consistently lower throughout life in the better economic areas, with the greatest differences from 25 to 45 years of age. In the case of influenza, pneumonia, and accidents, female mortality rates are lower in the good economic regions until middle life but higher after those ages, although the differences are unimportant until age 65.

TABLE 7.—*Death rates per 100,000 native white population by age and sex from* TUBERCULOSIS *in different types of rural communities, Ohio, 1930*

Age	Male		Female		Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status		Good economic status	Poor economic status	Good economic status	Poor economic status
Under 15	7	10	11	7	55–64	80	63	42	79
15–24	27	43	62	78	65–74	71	97	112	128
25–34	50	60	68	110	75+	116	108	124	130
35–44	39	73	44	63	All ages	35	46	44	57
45–54	40	63	37	39	Adjusted rate	33	44	43	57

TABLE 8.—*Death rates per 100,000 native white population by age and sex from* INFLUENZA AND PNEUMONIA *in different types of rural communities, Ohio, 1930*

Age	Male		Female		Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status		Good economic status	Poor economic status	Good economic status	Poor economic status
Under 5	239	352	197	299	55–64	104	95	121	108
5–14	14	19	8	22	65–74	280	266	326	231
15–24	17	15	15	23	75+	909	1,018	1,279	1,176
25–34	36	34	20	29	All ages	89	106	91	108
35–44	33	36	28	38	Adjusted rate	76	91	74	89
45–54	53	63	53	70					

TABLE 9.—*Death rates per 100,000 native white population by age and sex from* ACCIDENTAL CAUSES *in different types of rural communities, Ohio, 1930*

Age	Male		Female		Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status		Good economic status	Poor economic status	Good economic status	Poor economic status
Under 5	71	152	88	102	55–64	167	112	42	39
5–14	60	51	33	39	65–74	229	258	178	157
15–24	113	146	33	36	75+	520	676	850	817
25–34	88	153	25	29	All ages	115	145	64	70
35–44	119	168	22	26	Adjusted rate	106	138	54	57
45–54	106	135	40	36					

There is more variability among males, however. Mortality rates from tuberculosis are definitely lower until age 55 in the good economic areas but no consistent pattern appears after that age. Except for the very young and the very old, under 5 years and over 75 years, there is no significant difference in mortality from influenza and pneumonia. At both ends of the life span, though, mortality is considerably higher among persons living in regions of poor economic conditions. Mortality from accidental causes, with the exception of ages 5 to 14 and 55 to 64, is definitely greater in the poor economic areas. Of course, part of this higher mortality results from mining accidents, but the differences are still significant even at the ages when such accidents are unimportant, especially under 5 years of age when the rates in the two areas differ more than 100 percent.

Until about 45 or 50 years of age there is little difference between the two regions in mortality from the principal diseases of late adult life, cancer, heart disease, cerebral hemorrhage, and nephritis, although the rates in the poor economic area tend to be slightly higher (tables 10–13). After these ages, however, the death rates from cancer, heart disease, and nephritis are definitely greater in the regions of good economic status with one or two exceptions. When the rates are adjusted for differences in age distribution of the populations involved, the average rate is slightly higher in the good economic areas for each of these diseases except for heart disease among males where the rates are equal.

TABLE 10.—*Death rates per 100,000 native white population by age and sex from* CANCER *in different types of rural communities, Ohio, 1930*

Age	Male		Female		Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status		Good economic status	Poor economic status	Good economic status	Poor economic status
Under 35	5	4	4	6	65–74	597	465	573	500
35–44	27	27	61	77	75+	971	862	1,141	1,096
45–54	62	75	172	193	All ages	87	78	112	114
55–64	223	182	355	291	Adjusted rate	59	51	81	80

TABLE 11.—*Death rates per 100,000 native white population by age and sex from* CEREBRAL HEMORRHAGE *in different types of rural communities, Ohio, 1930*

Age	Male		Female		Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status		Good economic status	Poor economic status	Good economic status	Poor economic status
Under 45	5	3	6	7	75+	2,209	2,007	2,239	2,163
45–54	66	58	95	73	All ages	115	120	124	133
55–64	188	185	234	239	Adjusted rate	74	71	83	81
65–74	676	760	767	773					

TABLE 12.—*Death rates per 100,000 native white population by age and sex from* HEART DISEASE *in different types of rural communities, Ohio, 1930*

Age	Male		Female		Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status		Good economic status	Poor economic status	Good economic status	Poor economic status
Under 25	11	13	13	13	65-74	1,301	1,191	1,083	1,030
25-34	24	28	29	43	75+	3,453	3,554	3,751	2,930
35-44	47	66	48	54	All ages	215	224	203	193
45-54	136	121	131	135	Adjusted rate	142	142	139	124
55-64	407	398	391	301					

TABLE 13.—*Death rates per 100,000 native white population by age and sex from* NEPHRITIS[1] *in different types of rural communities, Ohio, 1930*

Age	Male		Female		Age	Male		Female	
	Good economic status	Poor economic status	Good economic status	Poor economic status		Good economic status	Poor economic status	Good economic status	Poor economic status
Under 35	7	4	7	11	65-74	441	414	385	299
35-44	18	11	26	33	75+	1,340	1,380	1,010	977
45-54	52	56	61	52	All ages	83	83	70	69
55-64	188	161	161	121	Adjusted rate	56	51	49	47

[1] Includes other diseases of the kidneys and ureters.

Although these data offer only indirect evidence, they do essentially corroborate existing information concerning the relationship of mortality rates and economic status. The evidence must be regarded as indirect since it was impossible to classify families according to economic status. It undoubtedly is true that there were some families in the good economic regions whose income was insufficient to maintain what would generally be considered an adequate standard of living, just as there probably were families in the poor economic regions whose income was more than sufficient to maintain such a standard of living. The mortality rates in this paper represent not only the direct results of the economic status of a family upon the health of its members but also the effects arising from the ability of the community to maintain essential medical and health facilities. Because of the virtual absence of any information concerning the relationship of mortality rates and economic status in rural cases, it seemed desirable to present these data even though they are not as specific as might be desired.

Quite apart from the corroborating evidence of previous investigations, the results of the present study are in general agreement with *a priori* expectation. If, as is commonly believed, the decline in the death rate has been largely produced by the widespread application

of the principles of medicine, hygiene, and sanitation in combination with a rising standard of living, then the greatest differences between the mortality rates of persons living in regions of good economic status and those living in regions of poor economic status would be expected to occur for diseases most readily prevented by the application of these principles. The higher mortality rates in the poor economic regions for diseases of infancy, diarrhea, enteritis, tuberculosis, and the principal diseases of childhood, measles, whooping cough, scarlet fever, and diphtheria, are in keeping with expectation.

The fact that the death rates from the important diseases of late adult life are somewhat lower in the poor economic regions would appear at first sight to support the theory that modern medical and public health practices tend to lessen the effects of natural selection and to preserve a larger proportion of the weak and unfit than would otherwise be true. According to this theory, high death rates during infancy and childhood eliminate the least physically fit members of society so that attempts to decrease mortality at those ages, if successful, would weaken the race. It does not seem necessary to examine the validity of this theory at this time, especially inasmuch as there is practically no direct evidence pro or con. It is unquestionably true that modern health activities do preserve for many years the lives of many persons who under conditions existing a century ago would have succumbed at an early age to some disease which is now prevented or cured. Whether or not this affects the physical vigor of the race is a debatable question. At least very few persons recommend the cessation of medical care and public health services because of their alleged harmful effects upon the physical health of the population.

SUMMARY

It is commonly believed that health and economic status are directly related. Existing data confirm this belief, especially for the urban population. However, almost no information is available concerning either the total amount of illness or its variation among persons of different economic status in rural areas.

Mortality records for the rural native white population of Ohio were tabulated by counties divided into two groups, one group comprising counties in poor agricultural areas and the other comprising counties in good agricultural areas.

The standardized death rate in the poor economic areas was about 10 percent greater than the corresponding rate in the good economic areas. The difference was particularly noticeable at the younger ages; however, after age 55 the rates in the good agricultural areas were slightly greater.

The difference in mortality rates was greatest for the diseases which modern medical and public health practices have been most successful in controlling or preventing. The infant mortality rate was 52 per 1,000 live births in the good economic areas but 75 per 1,000 live births in the poor economic areas. The rates for the principal communicable diseases of childhood were from two to three times higher in the poor areas. Smaller but corresponding differences were reported for deaths due to tuberculosis, diarrhea and enteritis, accidents, and influenza and pneumonia.

The standardized mortality rates from cancer, cerebral hemorrhage, heart disease, and nephritis were slightly higher in the good economic areas. Before age 50 there was little or no difference in the rates for these diseases, but after that age the rates in the good economic areas were generally higher.

THE EFFECT OF SULFAPYRIDINE AND SULFANILAMIDE WITH AND WITHOUT SERUM IN EXPERIMENTAL MENINGOCOCCUS INFECTION [1 2]

By SARA E. BRANHAM, *Senior Bacteriologist, United States Public Health Service*

In 1937 Buttle, Gray, and Stephenson (*1*) and Proom (*2*) reported the protection of mice against meningococcus infection with sulfanilamide. Very soon afterward Branham and Rosenthal (*3*) described the apparently synergistic action of immune serum with sulfanilamide in such infections. This was almost immediately confirmed by Brown (*4*). Since then sulfanilamide has been used extensively in human cases of meningococcus infections. More recently sulfapyridine, introduced by Whitby (*5*), has been used similarly and there has been some discussion as to the relative merits of the two drugs. Few have used the drugs alone in a significant number of cases. Some of the most valuable reports on the use of drug alone have been those of Schwentker, Gelman, and Long (*6*), Willien (*7*), Carey (*8*), Hobson, Oxon, and MacQuaide (*9*), Muraz, Chirle, and Quéguiner (*10*), Craddock (*11*), Somers (*12*), and Bryant and Fairman (*13*). The last two reports include together nearly 1,000 cases, and indicate that drug therapy is to be a great boon in isolated places where serum has always been difficult to obtain. Muraz and Craddock used sulfanilamide exclusively, and Somers used sulfapyridine.

In most instances both serum and drug have been used and every imaginable variation in method has been employed. There have been a few reports in which carefully controlled groups of cases have been treated by a planned method, of which may be mentioned those

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[1] From the Division of Biologics Control, National Institute of Health.

[2] Presented before Section VII of the Third International Congress for Microbiology in New York City, September 4, 1939.

of Banks (*14*), Waghelstein (*15*), Smith, Maxson, and Murphey (*16*), and Clyde and Neely (*17*). Each of these reports describes more than 100 cases, a total of about 500 cases, in which alternating groups were given serum only, drug only, and serum and drug. Antitoxin has been used more often than the usual antibacterial serum. In most of these studies the combination of the serum and drug has given most favorable results, although the difference has not always been conspicuous.

Almost every factor entering into clinical studies is variable and it is often difficult to evaluate the results unless a large number of cases is included. A quantitative study of these two drugs in meningococcus infections of mice and of their action with and without serum has seemed indicated. Our previous studies on the effect of combined serum and sulfanilamide therapy had been done with cultures varying greatly in virulence and with mice obtained from the open market. It was decided to standardize as much as possible the factors involved in the present studies.

Only pure line "CFW" (Swiss) mice inbred by brother-sister matings and weighing 16–20 grams have been used. Approximately an equal number of males and females were included.

The 6 strains of meningococci (3 of Group I and 3 of Group II) were kept at maximum virulence for mice throughout the whole period of study by daily transfer on rabbit blood agar and occasional passage through mice. The term "maximum virulence" means that from 2 to 10 meningococci suspended in mucin would kill a mouse weighing 16–20 grams in 48 hours. Our inbred mice became so susceptible that the concentration of the mucin in which the meningococci were suspended was reduced to 3.5 percent. The same lot of Wilson's granular mucin was used throughout. Five-hour cultures on rabbit blood agar slants were used. With a suspension containing approximately 2,000,000,000 meningococci as a starting point, 10-fold dilutions were made. At this rate dilution 10^{-9} should contain 2 meningococci. Obviously, wide variations are bound to occur, but a standard test dose of 1 cc. of 10^{-4} intraperitoneally was adopted and used throughout. This dose represented roughly 200,000 meningococci or 100,000 minimum fatal doses. The virulence of the culture was always checked in each test by including groups of control mice given 1 cc. of 10^{-7}, 10^{-8}, and 10^{-9} dilutions.

The same lots of sulfanilamide and sulfapyridine were used throughout these experiments. The drugs were suspended in 5-percent acacia and fed to the mice intragastrically by means of a child's size silver Eustachian tube catheter attached to a tuberculin syringe. The dose was usually contained in 0.2 cc. volume. A single dose was given. In the earlier experiments the drug was given immediately after the culture; later it was given 2 hours after the culture.

The sera used included 2 polyvalent antimeningococcic whole sera (horse), 2 polyvalent refined and concentrated sera (horse), 1 antitoxin (horse), 1 monovalent Group I rabbit serum, and 1 pooled normal horse serum. At least 3 dilutions were used in every experiment, and these were chosen on the basis of preliminary tests in mice. All were compared with our regular control antimeningococcic serum M 19, which was also used in many experiments. Serum dilutions were made in physiological salt solution and injected intraperitoneally in a volume of 0.5 cc. In the earliest experiments the serum was given before the culture; later it was given 2 hours after the infecting dose. This later plan was followed in the experiments reported here.

With both serum and drugs the dosage chosen was planned to be that which gave approximately 50 percent survival among the mice. Then the effect of the combination of serum and drug on the percentage of survival could be observed. In these studies of the protective activity of the two drugs, toxicity and rate of absorption were not considered.

The amounts of sulfanilamide and sulfapyridine that would protect approximately 50 percent of the mice to which a single dose was given by mouth were determined. The amount of drug required for this purpose was much less than has been used in other reported experiments where the protection of all mice was desired. Different strains of meningococci varied much in sensitivity to the drug, but in general 1 to 4 mg. of sulfanilamide, with an average dose of 2 mg., and 0.1 to 0.4 mg. of sulfapyridine, with an average dose of 0.2 mg., was the amount required. About ten times as much sulfanilamide as sulfapyridine was needed to protect 50 percent of the mice given 100,000 minimum fatal doses of meningococci. With sulfanilamide the amount of protection was in direct proportion to the size of the dose used. With sulfapyridine the same amount of protection was often observed to occur over a range of minute doses which were less than the amount required to protect all mice. Assuming that the drugs were completely absorbed by the mice, the concentration in the mouse would be less than might be expected to give a bacteriostatic action; that of sulfanilamide would be 1:10,000 and that of sulfapyridine 1:100,000. Neter (*18*) found some bacteriostatic action of sulfanilamide on meningococci in spinal fluid in a dilution of 1:10,000.

There was a great variation in the susceptibility of the individual strains of meningococci to the two drugs. Since all strains were at maximum virulence for mice, this difference, which was constant for each strain, could not be attributed to variation in virulence. Tables 1 and 2 show this difference. Strain 1041 (I) was most susceptible to both sulfanilamide and sulfapyridine. An amount of sulfanilamide that completely protected all mice against strain 1041

showed 80 percent mortality with 1027 of the same serological group. Strains 1054 (II) and 1037 (I) came next. Strains 1027 (I) and 963 (II) were fourth and fifth, and strain 1108 (II) was least susceptible. It seemed that the Group I strains were somewhat more susceptible to both drugs than the Group II strains, although No. 1054 (II) was an exception to this rule. In general, it may be said that gram for gram it required ten times as much sulfanilamide as sulfapyridine to protect a mouse of the weight used.

TABLE 1.—*Variation in response of 6 strains of meningococci to sulfanilamide* [1]

Strain	Percentage of deaths according to amount of sulfanilamide given				
	1 mg.	2 mg.	4 mg.	8 mg.	No drug
1027 I	80	10	10	0	100
1041 I	0	0	0	0	100
1037 I	40	0	0	0	90
963 II	60	60	0	0	100
1054 II	60	0	0	0	100
1108 II	80	60	60	60	90

[1] 100,000 minimum fatal doses of maximum virulence cultures.

TABLE 2.—*Variation in response of 6 strains of meningococci to sulfapyridine* [1]

Strain	Percentage of deaths according to amount of sulfapyridine given				
	0.1 mg.	0.2 mg.	0.4 mg.	0.8 mg.	No drug
1027 I	100	80	60	0	100
1041 I	80	40	0	0	90
1037 I	60	60	40	0	100
963 II	100	100	60	0	100
1054 II	60	80	0	0	100
1108 II	100	100	60	80	100
					100

[1] 100,000 minimum fatal doses of maximum virulence cultures.

It was expected that the different immune sera used would vary greatly in their protective action, and this was indeed the case. With the Group I strain (1027) used routinely by us in our regular mouse protection tests the amount of serum required to give 50 percent survival varied among the 6 sera used from as little as 0.000625 cc. to a point where 0.1 cc. failed to protect 50 percent of the mice. Table 3 shows the amounts of these sera required to protect 50 percent of the mice against infection with this Group I mouse strain.

Table 4 indicates the reaction of the six strains of meningococcus included in this study to a very good concentrated serum. One is struck immediately by the lower protection afforded the Group II strains as compared with those of Group I, although this serum is relatively richer in both agglutinins and precipitins for Group II than most polyvalent antimeningococcic sera. This is not a new obser-

vation. One is also struck by the variation in response of the individual strain of either serological Group to the same serum. Here the dilution giving 50 percent protection varies from 1—370 to less than 1—10 for the same serum with six strains of maximum virulence. The Group I strains responded to the serum in the following order: 1041, 1037, 1027. Among the Group II strains, 1054 is unaffected by serum, whereas 963 and 1108 respond to large doses. It is interesting to note that 1054 is most sensitive to the drug, though most serum resistant, of the Group II strains whereas 1108 responded very poorly to either drug when given alone in the doses used.

TABLE 3.—*Amounts of different antimeningococcic sera required to give 50 percent protection of mice against meningococcus 1027 I* [1]

Serum	Dilution	Survivals	Deaths	Accumulated		Percent survivals	Dilution for 50 percent survivals
				Survivals	Deaths		
A	1:50	8	2	16	2	89	
	1:100	6	4	8	6	57	1:112.
	1:200	2	8	2	14	13	(0.0044 cc).
B	1:60	2	8	12	8	60	
	1:120	4	6	10	14	42	1:89.
	1:240	6	4	6	18	25	(0.0056 cc).
C	1:60	9	1	22	1	95	
	1:120	8	2	13	3	81	1:200.
	1:240	5	5	5	8	38	(0.0025 cc).
D	1:400	8	2	16	2	89	
	1:800	4	6	8	8	50	1:800.
	1:1600	4	6	4	14	22	(0.000625 cc).
E	1:200	8	2	18	2	90	
	1:400	6	4	10	6	62	1:500.
	1:800	4	6	4	12	25	(0.001 cc).
F	1:10	0	10	0	10	0	
	1:20	0	10	0	20	0	
	1:40	0	10	0	30	0	
N	1:5	1	9	2	9	18	
	1:10	1	9	1	18	5	
	1:20	0	10	0	29	0	

[1] Dose=100,000 minimum fatal doses.

TABLE 4.—*Variation among strains of meningococci in response to antimeningococcic serum B*

Strain	Dilution	Survivals	Deaths	Accumulated		Percent survivals	Dilution for 50 percent survivals
				Survivals	Deaths		
1027 I	1:60	2	8	12	8	60	
	1:120	4	6	10	14	42	
	1:240	6	4	6	18	25	1:89.
1037 I	1:100	7	3	21	3	87	
	1:200	7	3	14	6	70	
	1:400	7	3	7	9	44	1:340.
1041 I	1:120	5	5	20	5	80	
	1:240	9	1	15	6	71	
	1:480	6	4	6	10	37	1:370.
963 II	1:60	5	5	9	5	64	
	1:120	3	7	4	12	25	
	1:240	1	9	1	21	4.5	1:76.
1054 II	1:10	1	9	2	9	19	
	1:20	1	9	1	18	5.2	
	1:40	0	10	0	28	0	Less than 1:10.
1108 II	1:20	4	6	9	6	60	
	1:40	4	6	5	12	29	
	1:80	1	9	1	21	4.5	1:25.

Since the infecting strain may be resistant to serum and sensitive to drugs or resistant to drugs and sensitive to serum, both agents should be considered in treating clinical cases. Each strain is apparently a law unto itself.

Although there is great variation in individual strains in their reaction to the drug or serum when given separately, it was found that all strains responded better to the combination of the two agents. This was true when the serum and drug were given before or after the culture. In the experiments presented here the culture (100,000 minimum fatal doses) was given 2 hours before the serum and drug. As mentioned before, the culture suspended in mucin was given intraperitoneally, the serum intraperitoneally, and the single dose of drug, in acacia, by mouth. The amounts of drug and serum given approximated those that would show 50 percent protection when given alone. Some of the results are shown graphically in figures 1 to 10.

In figure 1 it is seen that 100,000 minimum fatal doses of strain 1041 (I) kill all mice within 22 hours. The amounts of serum B and of sulfanilamide protected just 50 percent of the mice, though prolonging somewhat the lives of the others. The combination of the two agents protected all mice. In figure 2 the effect of serum B and sulfanilamide on strain 1027 (I) is shown. All untreated mice died within 21 hours; 60 percent of those receiving serum and 40 percent of those receiving sulfanilamide succumbed, whereas all mice receiving the combination survived. In figure 3 a similar effect is shown when the same strain, 1027 (I), and serum B are used with sulfapyridine. Mortality with serum alone was 60 percent, with sulfapyridine alone 50 percent, and with the combination it was 0. In the next two figures the same strain is used, but with a polyvalent serum which gave practically no protection. Figure 4 shows the surprising result when sulfapyridine was combined with this serum. Mortality with culture or with serum was 100 percent, with sulfapyridine 30 percent, and with the combination it was 0. Figure 5 shows the complete protection afforded by combining serum F, which showed no protection, with sulfanilamide. The effect here of the combined agents is more than additive. Figure 6 shows similar results with Group II strain 963. This strain is resistant to both serum and drug and the protection was not complete even with combined sulfanilamide and serum.

Such results suggested that horse serum in itself might have some property of aiding drug therapy. Strains 1027 (I) and 963 (II) were tested with sulfanilamide, using a pooled normal horse serum (G) in various low dilutions. Figures 7 and 8 show that no protective effect above that given by the drug alone could be elicited. Appar-

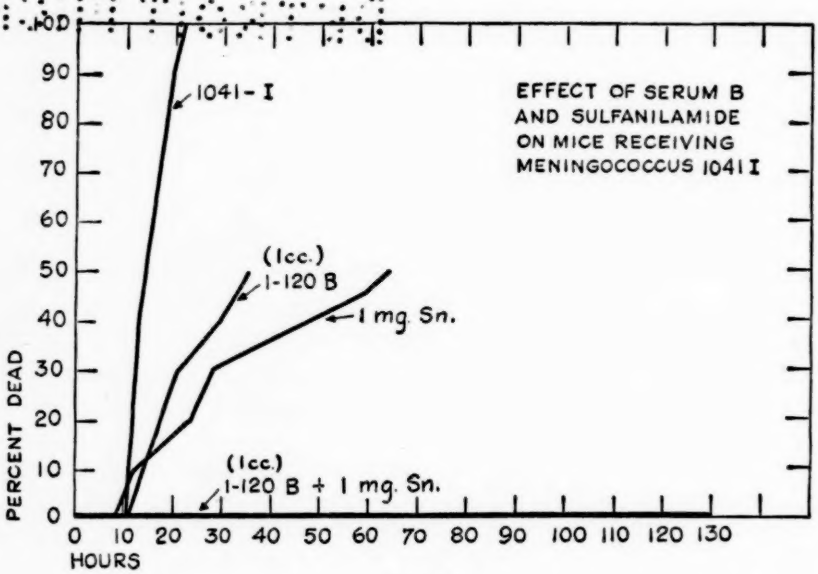


FIGURE 1.

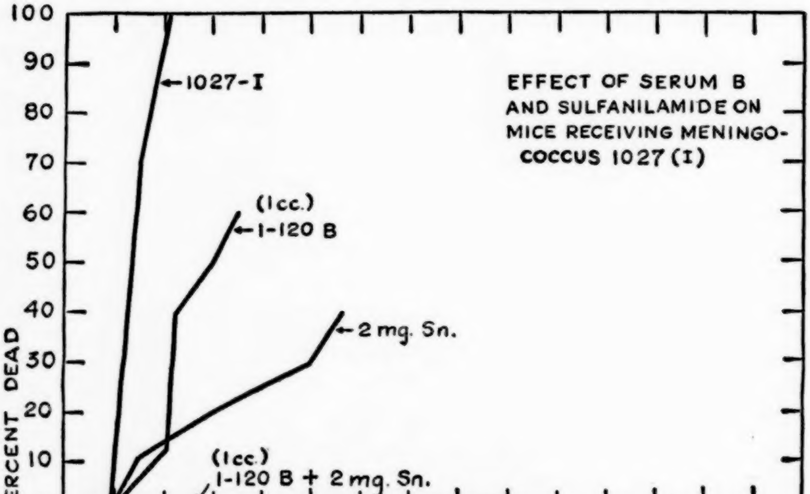


FIGURE 2.

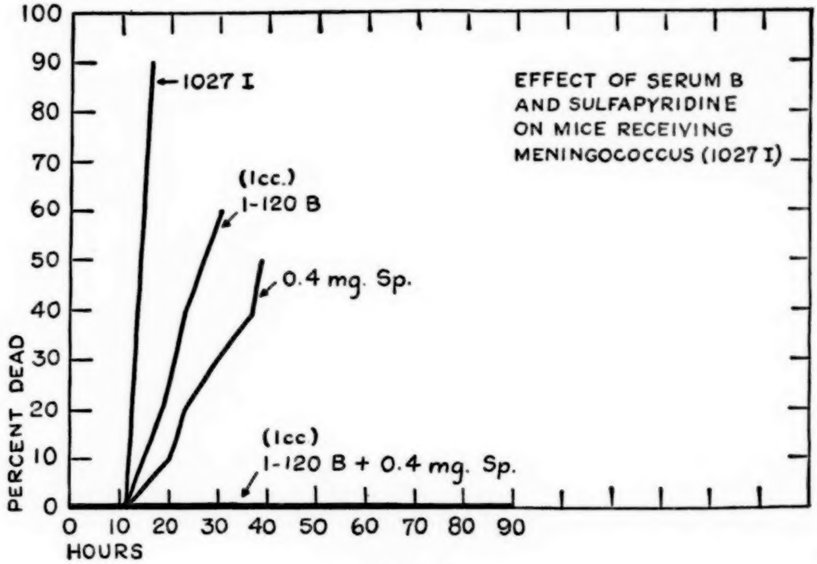


FIGURE 3.

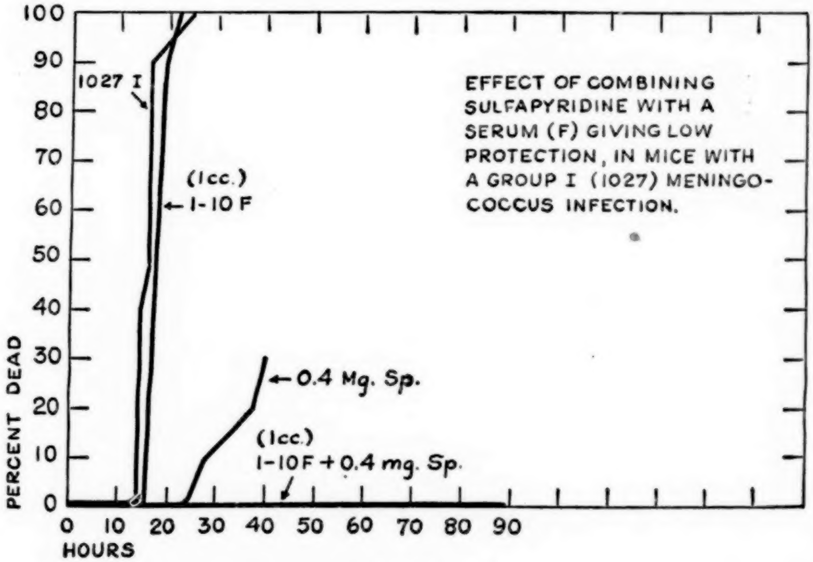
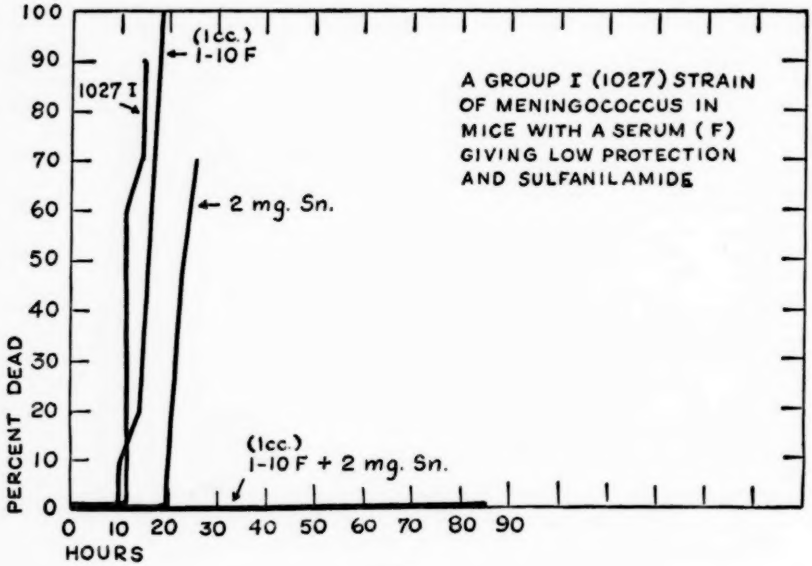


FIGURE 4.



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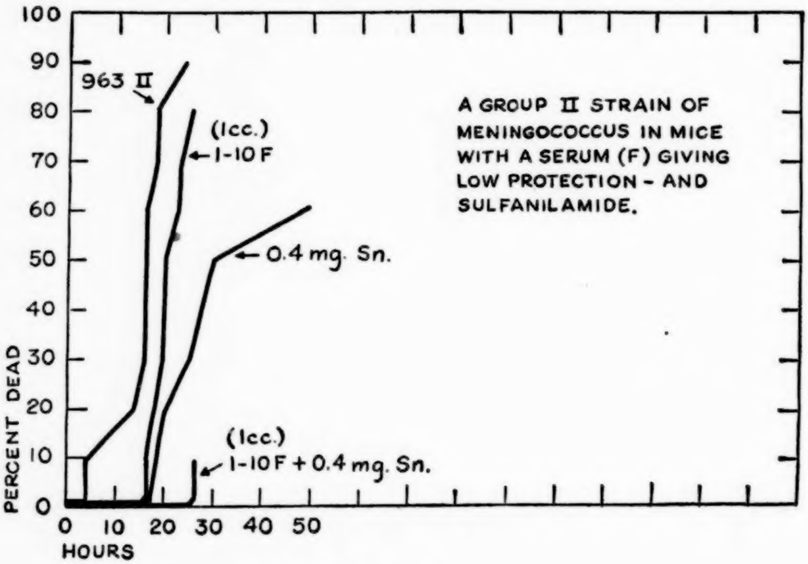

FIGURE 6.

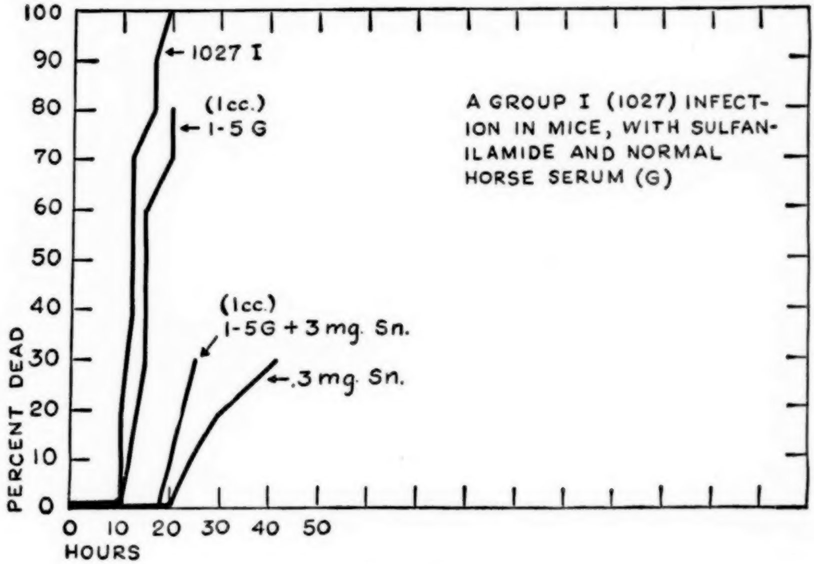

FIGURE 7.

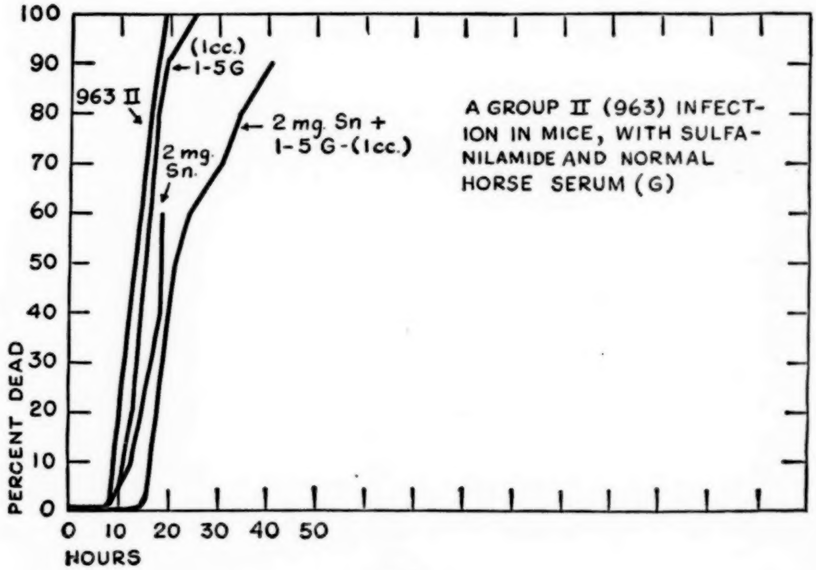

FIGURE 8.

ently there is something in the serum of immunized horses, not present in normal serum, that reacts favorably with the drugs studied. Even a poor immune serum seems to be of value in protecting mice when the drugs are also given.

We know that Group II strains are usually less responsive to serum than Group I strains. Group II strains show more individual variation in their response to drugs.

Figure 9 shows a Group II strain (1108) that proved to be especially drug resistant both experimentally and clinically. The mortality with the drug and culture was almost equal to that among the untreated mice with the usual dosage. When the amount of serum B that gave a 50 percent mortality was also used, the mortality was reduced to 20 percent.

Figure 10 shows a Group II (1054) strain that is decidedly serum resistant, though quite drug susceptible. We see that the combination of sulfapyridine and serum in the amounts used gave a complete protection.

DISCUSSION

The studies presented here cover about 75 experiments, each including about 200 mice. The results have been definite and constant and some of them seem well worth emphasizing at this time.

One interesting finding is the extremely small amounts of sulfanilamide and sulfapyridine that give some protection in mice. They have some degree of activity in concentration so low as to be at the limit of bacteriostatic action.

Weight for weight, sulfapyridine has shown a protective action against meningococcus infection in mice about ten times that of sulfanilamide under the conditions of the experiment. However the action of sulfapyridine has been somewhat less regular.

Individual strains of meningococci vary greatly in their response to the drugs, although those responding to treatment with sulfanilamide show a similar response to sulfapyridine and those resistant to one drug are also resistant to the other.

Likewise, there is a great difference in the response of individual strains to serum. For some strains, serum therapy has been more successful; for others the drugs have been far better. The case histories of the patients from whom the strains used in this study were isolated bear out this statement.

In all these experiments it has been consistently found that the combination of either of the drugs with serum has given results far better than with either agent alone. One of the serums had practically no protective action on any strain when used alone but marked protection could be obtained when it was given with the drugs.

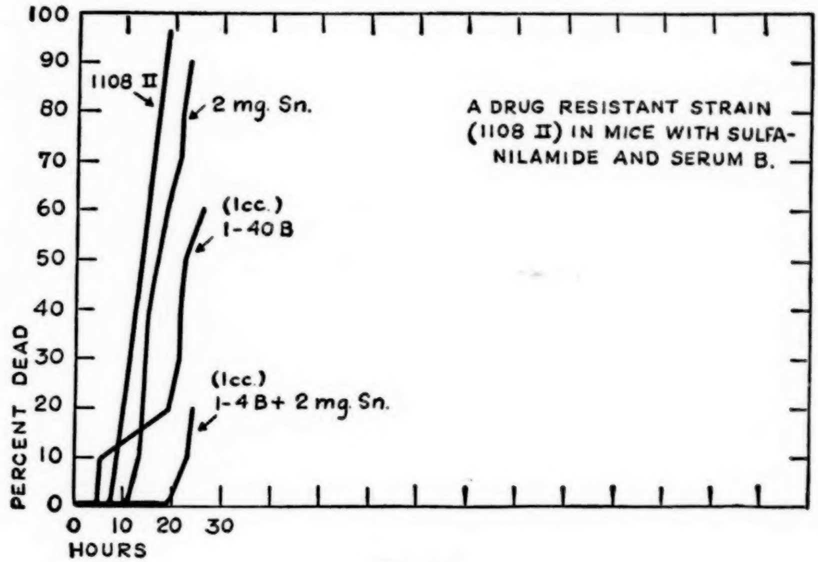

FIGURE 9.

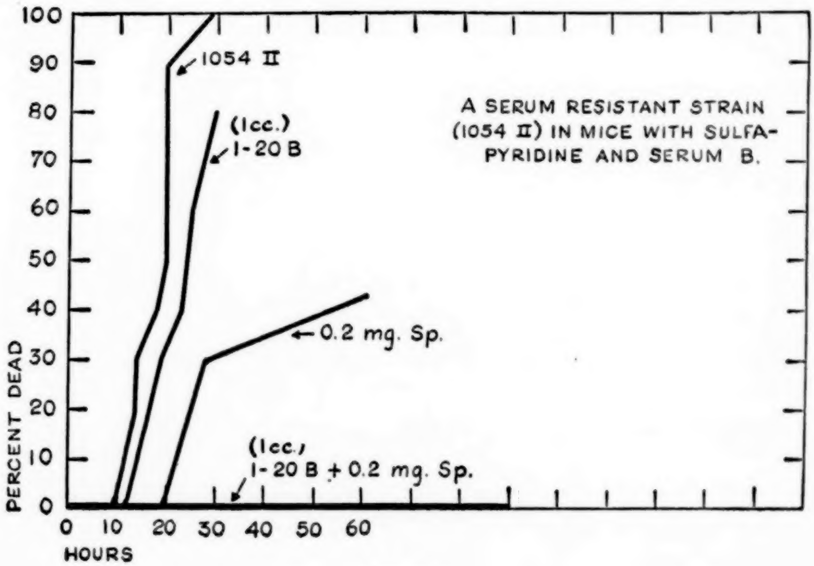

FIGURE 10.

Normal horse serum did not give this protection with the drugs. Apparently there is something in the serum of immunized horses, not measurable by the usual tests of antibodies, which acts with the drugs or is favorable to them.

The clinical histories associated with some of the strains of meningococci used are in accord with the findings of this study. Since there is such variation in response to serum and to drugs among various strains of meningococci, and since experimental infections with all strains respond so much better to the combination of drug and serum, it seems reasonable to treat patients with the combined therapy unless some contraindication is known. It is true that experiments with mice do not always mean that the same results will be obtained in man. But consistently good results in mice indicate that similar treatment should be given a fair trial in man.

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SOME NEW DATA ON THE DISTRIBUTION OF POLIOMYELITIS VIRUS

Although poliomyelitis does not stand high numerically in the list of human diseases from the standpoint of either the average numbers of cases reported annually or as a cause of death, it is one of the dreaded epidemic infections. It is feared largely because of the crippling which is frequently a distressing sequel and because of the feeling of insecurity that arises from the lack of a specific preventive measure. A safe and effective specific prophylactic procedure may ultimately be evolved, but so far this is a hoped-for prospect rather than an accomplished fact.

Recent investigations on the distribution of poliomyelitis virus may have a possible bearing on the mode of spread of the disease, concerning which able investigators differ. Members of the Department of Medicine of Yale University have recently demonstrated, for the first time, the presence of poliomyelitis virus in sewage.[1] Samples were collected from several localities in the city of Charleston, S. C., during the epidemic there in the summer of 1939. Inocula prepared from a sample taken from a pumping station at which sewage was received from a hospital where poliomyelitis patients were isolated caused experimental poliomyelitis in two monkeys, demonstrated by clinical symptoms and histologically in both animals and also in one animal by successful passage of the virus.

In another recent article,[2] the recovery of poliomyelitis virus from the stools of healthy contacts was reported. At least three such instances had been reported previously in the literature, and also the detection of a healthy carrier without history of contact with poliomyelitis cases. The facts developed from the study of this institutional outbreak, in which the virus of poliomyelitis was recovered from the stools of 3 out of 12 apparently healthy children in contact with cases and in a healthy adult nurse intimately associated with cases, support the theory that the infection is transferred by direct personal contact and offer corroborative evidence that the virus of poliomyelitis is probably spread throughout the general population by healthy carriers.

[1] Poliomyelitis virus in sewage. By John R. Paul, James D. Trask, and C. S. Culotta. Science, 90: 258-259 (September 15, 1939).

[2] Recovery of the virus of poliomyelitis from the stools of healthy contacts in an institutional outbreak By S. D. Kramer, A. G. Gilliam, and J. G. Molner. Pub. Health Rep., 54: 1914-1922 (October 27, 1939).

DEATHS DURING WEEK ENDED DECEMBER 16, 1939

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 16, 1939	Corresponding week, 1938
Data from 88 large cities of the United States:		
Total deaths	8,432	8,597
Average for 3 prior years	[1] 8,876	
Total deaths, first 50 weeks of year	412,016	406,328
Deaths under 1 year of age	464	540
Average for 3 prior years	[1] 542	
Deaths under 1 year of age, first 50 weeks of year	24,787	26,169
Data from industrial insurance companies:		
Policies in force	66,440,030	68,278,453
Number of death claims	12,215	14,027
Death claims per 1,000 policies in force, annual rate	9.6	10.7
Death claims per 1,000 policies, first 50 weeks of year, annual rate	9.8	9.2

[1] Data for 86 cities.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS*

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables, a zero (0) indicates a positive report and has the same significance as any other figure, while leaders (...) represent no report with the implication that cases or deaths may have occurred but were not reported to the State health officer.

Cases of certain diseases reported by telegraph by State health officers for the week ended Dec. 23, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median

Division and State	Diphtheria				Influenza				Measles			
	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median
NEW ENG.												
Maine	24	4	11	2	......	......	1	1	278	46	1	22
New Hampshire	0	0	6	0	......	......	......	......	20	2	......	24
Vermont	0	0	0	0	......	......	......	......	325	25	5	5
Massachusetts	6	5	4	7	......	......	......	......	209	178	196	195
Rhode Island	0	0	0	0	......	......	......	......	389	51	1	3
Connecticut	0	0	6	6	9	3	8	7	288	97	67	76
MID. ATL.												
New York	10	26	17	32	[1] 10	[1] 15	[1] 14	[1] 14	158	395	915	579
New Jersey	11	9	5	11	10	8	4	10	15	13	13	36
Pennsylvania	22	44	64	55	......	......	......	......	31	66	67	127
E. NO. CEN.												
Ohio	13	17	17	37	6	8	......	5	6	8	15	52
Indiana [2]	33	22	17	24	21	14	8	31	1	1	8	12
Illinois	26	39	27	40	9	14	25	34	14	21	15	27
Michigan [2]	5	5	9	11	5	5	......	1	218	206	253	111
Wisconsin	0	0	3	3	42	24	59	55	146	83	247	103
W. NO. CEN.												
Minnesota	0	0	2	3	6	3	2	......	60	31	289	54
Iowa	20	10	13	6	6	3	10	5	140	69	171	9
Missouri	30	23	10	22	6	5	59	85	8	6	2	15
North Dakota	0	0	5	2	190	26	6	3	15	2	336	14
South Dakota	30	4	9	4	15	2	1	......	23	3	128	2
Nebraska	0	0	2	5	......	......	1	......	4	1	5	5
Kansas	14	5	4	10	791	283	3	4	335	120	5	10
SO. ATL.												
Delaware	0	0	0	0	......	......	......	......	98	5	1	3
Maryland [2]	34	11	5	12	25	8	10	14	3	1	107	41
Dist. of Col.	8	1	6	10	8	1	3	3	16	2	3	3
Virginia [3]	28	15	35	30	62	33	111	......	7	4	49	49
West Virginia	24	9	10	19	40	15	18	43	13	5	12	43
North Carolina [4]	70	48	39	36	64	44	......	12	212	145	225	225
South Carolina [4]	19	[illegible]	3	3	4,474	1,638	236	236	3	1	3	7
Georgia [4]	25	15	10	14	1,619	975	68	68	15	9	28	0
Florida [4]	12	[illegible]	8	11	33	11	4	4	0	0	10	3

*Reports for two weeks are published in this issue, including the final week of 1939. Beginning in the next issue the publication of these reports will be advanced a week and will be for the week immediately preceding the week of issue.

Cases of certain diseases reported by telegraph by State health officers for the week ended Dec. 23, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Diphtheria				Influenza				Measles			
	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec 23, 1939 cases	Dec 24, 1938, cases	1934–38, median
E. SO. CEN.												
Kentucky	16	9	12	15	7	4	35	34	2	1	8	60
Tennessee [4]	25	14	7	28	175	99	17	50	76	43	14	12
Alabama [4]	16	9	18	20	700	398	115	156	14	8	81	19
Mississippi [2]	23	9	4	5	---	---	---	---	---	---	---	---
W. SO. CEN.												
Arkansas	40	16	7	7	196	79	106	52	0	0	9	5
Louisiana [4]	27	11	9	13	2	1	10	12	2	1	36	17
Oklahoma	10	5	19	19	239	119	71	80	4	2	26	9
Texas [1,5]	70	84	47	74	495	597	427	427	70	85	34	39
MOUNTAIN												
Montana	0	0	3	3	2,865	306	---	---	131	14	173	20
Idaho	0	0	2	1	---	---	12	4	20	2	83	13
Wyoming	22	1	4	1	327	15	---	---	262	12	3	2
Colorado	53	11	12	11	1,180	245	7	---	116	24	12	12
New Mexico	25	2	5	4	25	2	---	3	62	5	16	23
Arizona	74	6	3	3	920	75	131	76	37	3	2	2
Utah [2]	0	0	0	0	6,833	688	17	---	606	61	9	24
PACIFIC												
Washington	3	1	2	2	---	---	---	---	1,289	418	146	79
Oregon	10	2	0	1	497	100	12	39	184	37	13	13
California	18	22	42	33	107	131	23	35	156	190	702	46
Total	21	525	543	721	283	5,997	1,634	1,634	101	2,502	4,541	4,544
51 weeks	18	[5]23,589	29,312	29,312	169	182,255	64,354	116,947	295	372,517	794,431	719,482

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median
NEW ENG.												
Maine	0	0	0	1	6	1	0	0	97	16	7	17
New Hampshire	0	0	0	0	0	0	0	0	0	0	9	8
Vermont	0	0	0	0	0	0	0	0	94	7	9	9
Massachusetts	0	0	1	2	2.4	2	0	0	103	88	137	178
Rhode Island	0	0	0	0	0	0	0	0	23	3	7	28
Connecticut	0	0	0	0	0	0	0	0	181	61	54	54
MID. ATL.												
New York	0.4	1	3	5	0.4	1	1	2	141	353	333	433
New Jersey	0	0	0	0	2.4	2	0	0	135	113	49	103
Pennsylvania	5	9	5	5	1	2	0	1	140	276	343	393
E. NO. CEN.												
Ohio	0.8	1	1	3	0.8	1	0	0	178	231	258	274
Indiana [2]	0	0	2	1	0	0	0	0	160	108	133	172
Illinois	0	0	0	7	0.7	1	0	1	212	323	355	509
Michigan [2]	0	0	0	1	2.1	2	0	1	311	294	442	344
Wisconsin	0	0	0	0	5	3	0	0	228	130	188	257
W. NO. CEN.												
Minnesota	0	0	0	1	1.9	1	0	1	231	119	8	140
Iowa	0	0	0	2	8	4	0	0	146	72	132	132
Missouri	1.3	1	1	1	0	0	0	0	165	128	81	101
North Dakota	0	0	0	0	0	0	0	0	161	22	9	25
South Dakota	0	0	0	0	8	1	0	0	30	4	17	23
Nebraska	0	0	0	0	8	2	0	0	61	16	12	40
Kansas	6	2	2	2	0	0	0	1	291	104	115	125

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended Dec. 23, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median
SO. ATL.												
Delaware	0	0	0	0	0	0	0	0	472	24	12	16
Maryland [2]	0	0	0	3	3	1	0	0	142	46	32	69
Dist. of Col.	0	0	0	0	0	0	0	0	81	10	7	10
Virginia [3]	0	0	0	3	1.9	1	0	1	58	31	20	39
West Virginia	11	4	4	2	16	6	1	1	196	73	71	75
North Carolina [4]	0	0	1	1	1.5	1	0	0	99	68	40	53
South Carolina [4]	2.7	1	1	0	0	0	0	0	30	11	10	5
Georgia [4]	0	0	0	0	0	0	0	0	73	44	21	20
Florida [4]	0	0	3	2	0	0	1	0	24	8	8	7
E. SO. CEN.												
Kentucky	0	0	3	3	3	2	0	0	94	54	63	60
Tennessee [4]	5	3	1	2	0	0	0	1	164	93	32	41
Alabama [4]	0	0	1	1	0	0	3	1	37	21	31	20
Mississippi [2]	0	0	1	1	0	0	1	0	15	6	8	13
W. SO. CEN.												
Arkansas	0	0	0	0	5	2	0	0	47	19	12	12
Louisiana [4]	0	0	0	1	0	0	1	1	27	11	22	16
Oklahoma	2	1	0	3	8	4	0	0	46	23	48	36
Texas [4, 5]	1.7	2	2	2	3	4	1	0	70	84	74	75
MOUNTAIN												
Montana	9	1	0	0	0	0	0	0	281	30	22	33
Idaho	10	1	1	0	0	0	0	0	51	5	21	21
Wyoming	0	0	0	0	0	0	0	0	349	16	0	12
Colorado	14	3	3	0	10	2	0	0	241	50	24	51
New Mexico	0	0	0	0	12	1	0	0	334	27	16	24
Arizona	0	0	2	0	25	2	0	0	49	4	5	15
Utah [2]	0	0	1	1	10	1	0	0	149	15	13	55
PACIFIC												
Washington	0	0	1	2	0	0	0	1	167	54	48	49
Oregon	0	0	0	1	0	0	0	1	99	20	51	46
California	0	0	1	3	7	8	1	6	116	142	190	190
Total	1.2	30	41	81	2.3	58	10	33	138	3,457	3,599	4,783
51 weeks	1.5	1,931	2,781	5,307	6	7,270	1,690	7,230	124	158,500	183,035	218,448

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases
NEW ENG.											
Maine	0	0	0	0	6	1	0	1	84	14	17
New Hampshire	0	0	0	0	0	0	0	0	71	7	1
Vermont	0	0	0	0	0	0	0	0	469	35	96
Massachusetts	0	0	0	0	0	0	1	1	87	74	176
Rhode Island	0	0	0	0	0	0	0	0	115	15	33
Connecticut	0	0	0	0	3	1	0	0	199	67	54
MID. ATL.											
New York	0	0	0	0	3	8	5	5	140	351	473
New Jersey	0	0	0	0	2	2	1	1	98	82	280
Pennsylvania	0	0	0	0	5	9	9	8	127	250	396

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended Dec. 23, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases	1934–38, median	Dec. 23, 1939, rate	Dec. 23, 1939, cases	Dec. 24, 1938, cases
E. NO. CEN.											
Ohio	1	1	5	2	2	3	3	4	39	51	105
Indiana [2]	7	5	31	6	0	0	3	3	33	22	17
Illinois	0	0	3	2	1	1	7	6	47	71	341
Michigan [2]	0	0	6	1	2	2	2	4	117	111	203
Wisconsin	2	1	3	8	5	3	0	1	241	137	398
W. NO. CEN.											
Minnesota	37	19	15	11	0	0	0	1	81	42	14
Iowa	10	5	4	15	0	0	5	1	24	12	22
Missouri	1	1	9	4	5	4	4	4	26	20	25
North Dakota	0	0	1	5	0	0	0	0	15	2	4
South Dakota	38	5	4	4	8	1	0	0	0	0	3
Nebraska	11	3	1	1	0	0	0	0	8	2	2
Kansas	0	0	0	7	0	0	0	1	36	13	24
SO. ATL.											
Delaware	0	0	0	0	0	0	0	0	79	4	4
Maryland [2]	0	0	0	0	9	3	2	3	151	49	23
Dist. of Col	0	0	0	0	8	1	0	0	57	7	19
Virginia [3]	0	0	0	0	4	2	3	5	43	23	70
West Virginia	0	0	0	0	0	0	1	3	75	28	15
North Carolina [4]	0	0	0	0	1	1	0	1	53	36	152
South Carolina [4]	0	0	0	0	3	1	0	1	52	19	18
Georgia [4]	0	0	0	0	10	6	7	5	17	10	9
Florida [4]	0	0	0	0	0	0	1	1	12	4	34
E. SO. CEN.											
Kentucky	0	0	0	0	3	2	1	2	42	24	17
Tennessee [4]	2	1	0	0	4	2	0	2	56	32	19
Alabama [4]	4	2	0	1	0	0	3	3	2	1	36
Mississippi [2]	0	0	0	0	0	0	3	3	------	------	------
W. SO. CEN.											
Arkansas	10	4	0	0	7	3	3	2	10	4	29
Louisiana [4]	0	0	1	0	7	3	5	8	68	28	16
Oklahoma	10	5	7	1	0	0	2	2	0	0	5
Texas [4] [5]	4	5	2	3	18	22	20	16	88	106	21
MOUNTAIN											
Montana	9	1	0	1	0	0	0	1	56	6	0
Idaho	0	0	6	1	0	0	5	1	0	0	4
Wyoming	0	0	7	3	22	1	0	0	109	5	0
Colorado	221	46	5	5	0	0	1	1	53	11	32
New Mexico	0	0	0	0	37	3	3	3	519	42	30
Arizona	0	0	6	0	0	0	3	1	123	10	11
Utah [2]	20	2	0	0	0	0	0	0	397	40	18
PACIFIC											
Washington	0	0	0	17	0	0	0	2	12	4	10
Oregon	0	0	12	6	5	1	0	2	129	26	10
California	3	4	13	8	2	3	3	6	69	84	90
Total	4	110	141	163	4	89	106	135	80	1,981	3,376
51 weeks	7	9,4[illegible]6	14,200	7,307	10	12,630	14,127	14,930	135	170,367	207,289

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Dec. 23, 1939, Virginia, 1 case.
[4] Typhus fever, week ended Dec. 23, 1939, 49 cases as follows: North Carolina, 2; South Carolina, 1; Georgia, 19; Florida, 3; Tennessee, 1; Alabama, 4; Louisiana, 4; Texas, 15.
[5] There were 26 new cases of diphtheria in Texas during the week ended July 15 instead of 119 as published in the Public Health Reports of July 28, 1939, p. 1397.

Cases of certain diseases reported by State health officers for the week ended Dec. 30, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median

Division and State	Diphtheria				Influenza				Measles			
	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median
NEW ENG.												
Maine	12	2	10	3	6	1	4	4	235	39	5	21
New Hampshire	0	0	1	0	------	------	------	------	122	12	0	24
Vermont	0	0	0	0	------	------	------	------	322	24	12	12
Massachusetts	2	2	6	6	------	------	------	------	225	191	180	122
Rhode Island	8	1	0	0	------	------	------	------	771	101	0	6
Connecticut	0	0	7	1	3	1	6	6	199	67	50	50
MID. ATL.												
New York	10	26	36	38	[1] 6	[1] 9	[1] 12	[1] 19	128	319	645	378
New Jersey	18	15	18	18	19	16	19	19	29	24	20	48
Pennsylvania	19	37	25	31	------	------	------	------	30	60	42	150
E. NO. CEN.												
Ohio	19	25	55	55	35	45	------	11	19	25	16	60
Indiana	19	13	18	26	12	8	12	45	7	5	8	8
Illinois	29	45	49	49	10	15	20	35	11	17	22	22
Michigan [2]	6	6	17	17	------	------	1	3	182	172	160	101
Wisconsin	0	0	3	6	53	30	44	44	128	73	307	223
W. NO. CEN.												
Minnesota	2	1	9	5	4	2	4	------	130	67	541	32
Iowa	18	9	8	7	20	10	7	7	113	56	164	15
Missouri	3	2	14	33	1	1	29	67	3	2	3	12
North Dakota	7	1	3	2	175	24	12	------	22	3	135	1
South Dakota	15	2	2	1	30	4	7	1	30	4	260	2
Nebraska	0	0	2	2	------	------	2	------	8	2	3	4
Kansas	25	9	8	8	73	26	4	3	179	64	3	7
SO. ATL.												
Delaware	0	0	0	1	------	------	------	------	20	1	0	2
Maryland [3]	28	9	4	7	59	19	12	14	9	3	145	42
Dist. of Col.	16	2	1	5	40	5	7	3	0	0	1	4
Virginia [3]	56	30	44	34	365	195	175	------	22	12	9	50
West Virginia	32	12	18	18	51	19	13	22	22	8	32	32
North Carolina [4]	35	24	38	35	121	83	4	14	95	65	306	306
South Carolina [4]	27	10	6	5	6,176	2,261	347	311	16	6	3	8
Georgia [4]	18	11	9	18	1,117	673	124	86	12	7	95	0
Florida [4]	6	2	9	9	66	22	3	2	6	2	13	7
E. SO. CEN.												
Kentucky	33	19	16	16	12	7	38	22	23	13	7	17
Tennessee	14	8	10	25	53	30	42	63	120	68	17	17
Alabama [4]	70	40	19	23	2,284	1,298	143	143	26	15	42	41
Mississippi [2, 4]	33	13	11	8	------	------	------	------	------	------	------	------
W. SO. CEN.												
Arkansas	37	15	15	15	233	94	208	36	0	0	44	18
Louisiana [4]	36	15	13	13	------	------	10	10	17	7	29	21
Oklahoma	28	14	15	15	253	126	123	114	8	4	9	4
Texas [4]	32	39	35	67	277	334	385	385	56	67	85	32
MOUNTAIN												
Montana	9	1	0	1	1,797	192	15	7	56	6	281	5
Idaho	0	0	3	0	10	1	5	5	898	88	25	21
Wyoming	0	0	1	0	2,509	115	------	------	44	2	18	1
Colorado	39	8	8	6	698	145	41	------	63	13	22	22
New Mexico	12	1	2	3	111	9	4	4	161	13	9	22
Arizona	25	2	2	2	1,251	102	120	78	110	9	2	2
Utah [2]	10	1	1	1	9,574	964	8	------	626	63	16	16

See footnotes at end of table.

Cases of certain diseases reported by State health officers for the week ended Dec. 30, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Diphtheria				Influenza				Measles			
	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median
PACIFIC												
Washington	6	2	3	3	6	2			974	316	139	69
Oregon	20	4	1	1	850	171	40	36	154	31	21	15
California [4]	16	19	39	40	31	38	26	40	157	191	835	66
Total	20	497	614	696	335	7,097	2,071	2,088	94	2,337	4,781	4,781
52 weeks	18	24,086	29,926	29,926	172	189,352	66,425	118,416	291	374,854	799,212	721,872

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median
NEW ENG.												
Maine	0	0	0	0	0	0	0	0	72	12	27	20
New Hampshire	0	0	0	0	0	0	0	0	30	3	10	12
Vermont	0	0	0	0	0	0	0	0	0	0	9	8
Massachusetts	0	0	1	1	2.4	2	0	0	140	119	124	153
Rhode Island	8	1	0	0	0	0	0	0	31	4	8	12
Connecticut	0	0	1	0	0	0	0	0	184	62	43	49
MID. ATL.												
New York	0	0	5	8	1.2	3	0	1	148	371	364	449
New Jersey	0	0	0	2	0	0	1	1	236	198	91	104
Pennsylvania	5	10	2	2	0.5	1	0	1	175	344	217	302
E. NO. CEN.												
Ohio	3	4	0	4	0.8	1	0	0	264	344	328	332
Indiana	0	0	0	1	0	0	0	0	174	117	165	165
Illinois	1.3	2	3	4	0.7	1	3	3	211	322	38	499
Michigan [2]	1.1	1	2	2	0	0	0	0	286	271	463	301
Wisconsin	0	0	0	1	0	0	0	0	276	157	192	258
W. NO. CEN.												
Minnesota	0	0	0	1	1.9	1	0	0	202	104	114	114
Iowa	0	0	0	0	6	3	0	0	324	160	82	102
Missouri	0	0	2	2	0	0	0	0	59	46	91	104
North Dakota	0	0	0	1	0	0	0	0	183	25	10	31
South Dakota	0	0	0	0	0	0	0	0	165	22	23	30
Nebraska	0	0	0	0	0	0	0	0	53	14	21	33
Kansas	2.8	1	0	1	2.8	1	0	0	198	71	148	148
SO. ATL.												
Delaware	0	0	0	0	0	0	0	0	138	7	8	8
Maryland [2]	0	0	0	2	0	0	0	0	188	61	29	56
Dist. of Col	0	0	0	1	0	0	1	0	73	9	5	14
Virginia [3]	0	0	2	2	0	0	0	0	66	35	39	48
West Virginia	5	2	0	3	8	3	0	0	199	74	48	63
North Carolina [4]	1.5	1	2	1	1.5	1	0	0	64	44	43	43
South Carolina [4]	0	0	2	0	0	0	3	0	11	4	9	8
Georgia [4]	1.7	1	0	2	0	0	1	0	37	22	11	19
Florida [4]	0	0	2	2	0	0	1	1	33	11	10	10
E. SO. CEN.												
Kentucky	7	4	3	5	1.7	1	1	0	101	58	86	57
Tennessee	1.8	1	0	1	0	0	0	0	39	22	52	38
Alabama [4]	1.8	1	5	4	0	0	1	1	83	47	37	12
Mississippi [2] [4]	0	0	1	1	2.5	1	1	1	20	8	7	11

See footnotes at end of table.

Cases of certain diseases reported by State health officers for the week ended Dec. 30, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Meningitis meningococcus				Poliomyelitis				Scarlet fever			
	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median
W. SO. CEN.												
Arkansas	0	0	0	0	0	0	3	1	42	17	20	16
Louisiana [4]	0	0	1	1	0	0	0	0	36	15	8	14
Oklahoma	0	0	2	3	2	1	0	0	46	23	59	42
Texas [4]	0	0	0	2	0	0	3	2	40	48	104	104
MOUNTAIN												
Montana	0	0	0	0	0	0	0	0	225	24	12	16
Idaho	0	0	2	1	0	0	0	0	133	13	4	21
Wyoming	0	0	0	0	0	0	0	0	131	6	10	13
Colorado	0	0	0	0	0	0	0	0	101	21	49	49
New Mexico	0	0	0	0	25	2	0	0	185	15	21	17
Arizona	0	0	3	1	0	0	0	0	98	8	3	13
Utah [2]	0	0	0	0	0	0	0	0	70	7	15	53
PACIFIC												
Washington	3	1	0	0	9	3	1	0	148	48	52	52
Oregon	0	0	0	0	0	0	0	0	94	19	55	48
California [4]	0.8	1	2	3	2.5	3	0	4	98	120	133	171
Total	1.2	31	43	75	1.1	28	20.	35	141	3,552	3,497	4,977
52 weeks	1.5	1,962	2,824	5,390	6	7,298	1,710	7,276	124	162,052	186,532	223,425

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases
NEW. ENG.											
Maine	0	0	0	0	0	0	0	1	260	43	42
New Hampshire	0	0	0	0	0	0	0	0	10	1	0
Vermont	0	0	0	0	13	1	0	0	402	30	63
Massachusetts	0	0	0	0	2	2	0	2	103	88	126
Rhode Island	0	0	0	0	0	0	0	0	46	6	20
Connecticut	0	0	0	0	0	0	0	0	131	44	43
MID. ATL.											
New York	0	0	0	0	2	4	6	7	157	391	410
New Jersey	0	0	0	0	4	3	3	3	138	116	313
Pennsylvania	0	0	0	0	4	7	9	7	155	306	252
E. NO. CEN.											
Ohio	2	2	6	3	7	9	3	4	116	151	76
Indiana	0	0	38	5	0	0	1	1	21	14	3
Illinois	0	0	5	5	7	10	1	3	69	106	315
Michigan [3]	0	0	4	1	7	7	6	1	110	104	266
Wisconsin	18	10	5	7	4	2	1	0	206	117	270
W. NO. CEN.											
Minnesota	54	28	19	17	0	0	1	1	60	31	7
Iowa	45	22	12	7	0	0	6	4	45	22	18
Missouri	0	0	20	9	1	1	3	6	4	3	11
North Dakota	0	0	0	5	0	0	0	0	15	2	7
South Dakota	30	4	9	5	0	0	0	0	0	0	2
Nebraska	4	1	6	10	0	0	1	0	4	1	7
Kansas	0	0	0	6	3	1	0	1	22	8	11

See footnotes at end of table.

Cases of certain diseases reported by State health officers for the week ended Dec. 30, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases	1934–38, median	Dec. 30, 1939, rate	Dec. 30, 1939, cases	Dec. 31, 1938, cases
SO. ATL.											
Delaware	0	0	0	0	0	0	0	0	118	6	0
Maryland [2]	0	0	0	0	9	3	3	4	142	46	33
Dist. of Col	0	0	0	0	8	1	0	1	81	10	12
Virginia [3]	0	0	0	0	11	6	0	5	39	21	62
West Virginia	5	2	1	0	3	1	1	1	35	13	36
North Carolina [4]	0	0	0	0	1	1	3	6	64	44	144
South Carolina [4]	0	0	0	0	0	0	7	1	52	19	25
Georgia [4]	0	0	1	0	10	6	7	5	3	2	16
Florida [4]	0	0	0	0	3	1	3	2	6	2	9
E. SO. CEN.											
Kentucky	0	0	0	0	0	0	4	3	134	77	5
Tennessee	0	0	0	0	4	2	2	5	19	11	15
Alabama [4]	0	0	0	0	2	1	6	7	42	24	34
Mississippi [2] [4]	0	0	0	0	0	0	1	2			
W. SO. CEN.											
Arkansas	22	9	7	5	12	5	2	8	5	2	10
Louisiana [4]	0	0	0	0	19	8	4	4	27	11	5
Oklahoma	16	8	22	1	8	4	2	5	0	0	10
Texas [4]	3	4	7	3	9	11	4	9	65	79	52
MOUNTAIN											
Montana	0	0	5	10	0	0	0	0	47	5	18
Idaho	0	0	6	3	0	0	3	0	20	2	2
Wyoming	0	0	0	1	0	0	0	0	305	14	3
Colorado	82	17	1	1	5	1	4	0	53	11	25
New Mexico	0	0	0	0	62	5	1	4	259	21	13
Arizona	12	1	8	0	0	0	3	2	49	4	4
Utah [2]	20	2	0	0	10	1	0	0	516	52	15
PACIFIC											
Washington	12	4	2	11	0	0	0	1	15	5	10
Oregon	5	1	5	5	0	0	0	0	199	40	11
California [4]	2	3	8	8	2	2	3	8	80	97	63
Total	5	118	197	193	4	106	104	129	89	2, 202	2, 924
52 weeks	7	9, 574	14, 397	7, 490	10	12, 736	14, 231	15, 059	134	172, 569	210, 213

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Dec. 30, 1939, Virginia, 1 case.
[4] Typhus fever, week ended Dec. 30, 1939, 36 cases as follows: North Carolina, 2; South Carolina, 4; Georgia, 10; Florida, 5; Alabama, 4; Mississippi, 4; Louisiana, 4; Texas, 2; California, 1.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Diphtheria	Influenza	Malaria	Measles	Meningitis, meningococcus	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid and paratyphoid fever
November 1939										
Colorado	31	133		105	1		21	141	19	7
Georgia	148	587	293	21	2	9	1	142	1	30
Kansas	32	27	1	262	0		2	430	1	10
Louisiana	62	35	32	5	7	7	1	76	2	50
Maine	11	2		94	0		0	52	0	7
Mississippi	93	4,580	2,266	160	4	233	2	57	0	12
Montana	4	327		86	0		0	155	6	1
Nebraska	10	5		6	0		13	65	2	4
New Mexico	11	5	2	12	2		11	40	0	11
New York	54		10	814	11		78	882	0	40
North Dakota	4	17		7	0		1	104	0	1
Ohio	201	113		106	1		16	1,125	4	27
Oklahoma	71	195	95	9	2	7	10	89	12	23
Tennessee	133	134	53	40	3	17	1	331	5	21

November 1939

	Cases
Chickenpox:	
Colorado	225
Georgia	33
Kansas	407
Louisiana	36
Maine	216
Mississippi	350
Montana	268
Nebraska	57
New Mexico	99
New York	1,994
North Dakota	86
Ohio	1,243
Oklahoma	44
Tennessee	88
Conjunctivitis, acute infectious:	
Georgia	4
New Mexico	1
Dengue:	
Georgia	4
Diarrhea:	
New Mexico	4
Ohio (under 2 years; enteritis included)	25
Dysentery:	
Colorado (bacillary)	2
Georgia (amoebic)	5
Georgia (bacillary)	19
Georgia (unspecified)	2
Kansas	5
Louisiana (amoebic)	6
Louisiana (bacillary)	1
Maine (bacillary)	1
Mississippi (amoebic)	113
Mississippi (bacillary)	246
New Mexico (amoebic)	2
New Mexico (bacillary)	9
New York (amoebic)	8
New York (bacillary)	71
Ohio (amoebic)	1
Ohio (bacillary)	2
Oklahoma (bacillary)	13
Tennessee (amoebic)	5
Tennessee (bacillary)	11
Encephalitis, epidemic or lethargic:	
Colorado	1
Kansas	5
Montana	43
New Mexico	2
New York	7
Ohio	2

	Cases
German measles:	
Kansas	9
Maine	19
Montana	1
New Mexico	4
New York	51
North Dakota	3
Ohio	19
Tennessee	1
Hookworm disease:	
Georgia	4,108
Louisiana	6
Mississippi	697
Tennessee	8
Impetigo contagiosa:	
Kansas	11
Montana	9
Ohio	39
Tennessee	20
Lead poisoning:	
Ohio	8
Leprosy:	
Mississippi	1
Oklahoma	1
Mumps:	
Colorado	113
Georgia	44
Kansas	107
Louisiana	10
Maine	6
Mississippi	210
Montana	108
Nebraska	86
New Mexico	28
North Dakota	99
Ohio	356
Oklahoma	11
Tennessee	13
Ophthalmia neonatorum:	
Mississippi	2
New York	13
Oklahoma	2
Tennessee	3
Puerperal septicemia:	
Mississippi	23
New Mexico	2
Ohio	4
Tennessee	1
Rabies in animals:	
Louisiana	6
Mississippi	2
New Mexico	3
New York [1]	10

	Cases
Rocky Mountain spotted fever:	
New York	1
Scabies:	
Kansas	20
Montana	2
Screw worm infection:	
Georgia	1
Septic sore throat:	
Colorado	1
Georgia	43
Kansas	17
Louisiana	6
Montana	3
Nebraska	2
New Mexico	11
New York	77
Ohio	10
Oklahoma	29
Tennessee	19
Tetanus:	
Georgia	1
Kansas	1
Louisiana	6
New York	5
Ohio	2
Oklahoma	2
Tennessee	1
Trachoma:	
Mississippi	3
Montana	2
North Dakota	4
Ohio	13
Oklahoma	169
Tennessee	1
Trichinosis:	
New York	16
Tularaemia:	
Colorado	2
Georgia	2
Kansas	58
Louisiana	2
New York	2
Ohio	13
Oklahoma	1
Tennessee	1
Typhus fever:	
Georgia	113
Louisiana	10
Mississippi	4
New York	7
Tennessee	18

[1] Exclusive of New York City.

Summary of monthly reports from States—Continued

November 1939—Continued

Undulant fever:	Cases	Vincent's infection:	Cases	Whooping cough—Con.	Cases
Colorado	3	Kansas	11	Maine	159
Georgia	5	Maine	2	Mississippi	727
Kansas	9	New York[1]	56	Montana	12
Louisiana	3	North Dakota	3	Nebraska	18
Maine	1	Oklahoma	5	New Mexico	80
Mississippi	2	Tennessee	31	New York	1,444
Montana	1	Whooping cough:		North Dakota	81
New York	27	Colorado	45	Ohio	620
Ohio	9	Georgia	48	Oklahoma	9
Oklahoma	11	Kansas	60	Tennessee	199
Tennessee	4	Louisiana	107		

[1] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 16, 1939

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	207	256	60	1,088	717	1,350	17	345	26	1,047	--------
Current week[1]	118	213	29	666	458	1,007	0	329	16	726	--------
Maine:											
Portland	0	--------	0	8	1	1	0	1	0	3	23
New Hampshire:											
Concord	0	--------	0	0	1	0	0	0	0	0	14
Manchester	0	--------	0	0	3	0	0	0	0	0	24
Nashua	0	--------	0	1	0	0	0	0	0	0	2
Vermont:											
Barre	0	--------	0	0	0	0	0	0	0	5	3
Burlington	0	--------	0	1	0	0	0	0	0	9	8
Rutland	0	--------	0	0	0	0	0	0	0	0	8
Massachusetts:											
Boston	0	--------	1	59	16	28	0	6	0	31	234
Fall River	0	--------	0	0	2	0	0	0	0	25	34
Springfield	0	--------	0	1	0	0	0	1	0	12	40
Worcester	0	--------	0	1	8	6	0	1	0	3	50
Rhode Island:											
Pawtucket		--------	0	0	0	1	0	0	0	0	20
Providence	1	--------	1	80	6	9	0	1	0	14	78
Connecticut:											
Bridgeport	0	--------	0	1	1	3	0	2	0	0	25
Hartford	0	--------	0	0	0	6	0	2	0	24	41
New Haven	0	--------	0	0	1	3	0	0	0	14	47
New York:											
Buffalo	0	--------	0	7	8	12	0	6	0	6	126
New York	19	29	2	25	71	123	0	79	2	85	1,425
Rochester	0	--------	0	0	0	10	0	0	0	5	42
Syracuse	2	--------	0	0	3	1	0	4	0	28	57
New Jersey:											
Camden	0	--------	0	0	3	11	0	0	0	1	33
Newark	0	4	0	0	7	16	0	3	0	34	94
Trenton	1	--------	0	0	2	1	0	1	0	0	25
Pennsylvania:											
Philadelphia	6	5	3	4	16	49	0	18	1	57	478
Pittsburgh	4	3	4	4	9	26	0	5	0	7	161
Reading	1	--------	0	2	2	0	0	0	2	2	22
Scranton	0	--------	--------	0	--------	5	0	--------	0	0	--------
Ohio:											
Cincinnati	11	--------	1	0	3	22	0	5	0	4	135
Cleveland	1	15	0	0	16	33	0	10	0	21	180
Columbus	5	--------	0	1	7	5	0	2	0	6	84
Toledo	0	1	0	1	1	15	0	6	0	6	73
Indiana:											
Anderson	0	--------	0	0	2	0	0	0	0	0	9
Fort Wayne	0	--------	0	0	2	6	0	0	0	0	25
Indianapolis	3	--------	0	2	8	24	0	5	0	4	120
Muncie	0	--------	0	0	1	1	0	0	0	0	10
South Bend	0	--------	0	1	1	1	0	0	0	1	15
Terre Haute	0	--------	0	0	1	0	0	0	0	0	23

[1] Figures for Boise estimated; report not received.

City reports for week ended Dec. 16, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Illinois:											
Alton	0	1	1	0	0	2	0	0	0	0	8
Chicago	6	13	0	12	37	174	0	35	0	29	709
Elgin	1		0	0	2	4	0	0	0	1	12
Moline	0		0	0	0	3	0	0	0	0	9
Springfield	0		0	0	4	0	0	0	0	3	26
Michigan:											
Detroit	5	1	0	10	25	74	0	12	0	30	274
Flint	0		0	1	4	9	0	0	0	15	20
Grand Rapids	0		0	1	3	21	0	0	0	4	45
Wisconsin:											
Kenosha	0		0	0	1	1	0	0	0	0	10
Madison	0		0	0	0	4	0	0	0	11	11
Milwaukee	0		0	2	2	45	0	3	0	11	108
Racine	0		0	0	0	2	0	0	0	10	10
Superior	0		0	0	0	3	0	0	0	0	6
Minnesota:											
Duluth	0		0	38	1	1	0	0	0	0	34
Minneapolis	0		0	3	7	20	0	0	0	12	101
St. Paul	0		0	3	5	15	0	2	0	34	67
Iowa:											
Cedar Rapids	1			2		1	0		0	1	
Davenport	2			1		9	0		0	0	
Des Moines	0		0	25	0	11	2	0	0	0	33
Sioux City	0			0		6	0		0	0	
Waterloo	2			0		8	0		0	2	
Missouri:											
Kansas City	0		1	1	5	24	0	4	0	0	97
St. Joseph	0		0	0	4	2	0	0	0	0	25
St. Louis	4	2	1	2	4	26	0	6	1	10	187
North Dakota:											
Fargo	0		0	0	1	0	0	0	0	0	9
Grand Forks	0			0		4	0		0	3	
Minot	0		0	1	0	1	0	0	0	0	5
South Dakota:											
Aberdeen	1			0		1	0		0	0	
Sioux Falls	0		0	1	0	6	0	0	0	0	12
Nebraska:											
Omaha	0		0	0	4	3	0	1	0	3	57
Kansas:											
Lawrence	0	7	0	0	1	0	0	0	0	0	6
Topeka	0	1	1	0	0	4	0	1	0	0	11
Wichita	1		0	30	2	1	0	0	0	2	0
Delaware:											
Wilmington	1		0	0	3	3	0	0	0	5	36
Maryland:											
Baltimore	4	7	0	2	14	6	0	12	2	51	209
Cumberland	0		0	0	1	0	0	0	0	0	5
Frederick	0		0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	1		0	0	10	12	0	10	1	19	155
Virginia:											
Lynchburg	2		0	0	1	2	0	0	0	6	10
Norfolk	0	6	0	0	3	1	0	1	0	0	21
Richmond	1		1	11	6	4	0	2	0	2	63
Roanoke	0		0	1	0	3	0	0	0	0	15
West Virginia:											
Charleston	0		0	0	1	1	0	0	0	1	27
Huntington	1			0		0	0		0	0	
Wheeling	0		0	2	5	3	0	1	0	1	26
North Carolina:											
Gastonia	0			0		0	0		0	0	
Raleigh	1		0	0	0	1	0	1	0	0	3
Wilmington	1		0	0	3	0	0	1	0	0	15
Winston-Salem	0	1	0	0	1	2	0	1	0	0	10
South Carolina:											
Charleston	1	42	0	0	2	1	0	1	0	0	18
Florence	4	15	0	0	1	2	0	1	0	0	11
Greenville	0		0	0	1	0	0	0	0	0	17
Georgia:											
Atlanta	1	28	0	9	6	9	0	3	0	0	78
Brunswick	0		0	0	0	1	0	0	0	0	3
Savannah	1	16	0	0	4	3	0	2	0	0	40
Florida:											
Miami	1	8	0	1	5	1	0	2	0	0	39
Tampa	1	2	2	0	0	0	0	0	0	0	28

City reports for week ended Dec. 16, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Kentucky:											
Ashland	0	---	0	0	1	0	0	0	0	1	6
Covington	0	1	0	0	0	1	0	1	0	0	20
Lexington	1	---	0	0	0	2	0	1	0	6	17
Louisville	0	---	0	2	10	12	0	3	0	32	77
Tennessee:											
Knoxville	1	---	0	0	1	9	0	1	0	0	25
Memphis	0	---	3	1	4	9	0	4	0	6	77
Nashville	0	---	0	12	5	3	0	4	0	2	45
Alabama:											
Birmingham	4	13	2	0	8	8	0	5	1	0	79
Mobile	0	---	2	0	2	2	0	0	0	0	34
Montgomery	0	15	---	1	---	3	0	---	0	0	---
Arkansas:											
Fort Smith	0	---	---	0	---	0	0	---	1	0	---
Little Rock	0	3	0	0	3	1	0	1	0	3	14
Louisiana:											
Lake Charles	0	---	0	0	2	0	0	0	0	0	7
New Orleans	5	2	2	0	17	18	0	11	1	0	180
Shreveport	1	---	0	0	10	0	0	2	0	0	33
Oklahoma:											
Oklahoma City	1	---	0	0	4	1	0	1	0	0	41
Tulsa	0	---	---	2	---	4	0	---	0	0	---
Texas:											
Dallas	5	---	0	0	4	8	0	3	0	0	72
Fort Worth	0	---	0	0	2	6	0	0	0	11	34
Galveston	5	---	0	0	1	0	0	1	0	0	14
Houston	3	---	0	0	5	5	0	2	0	0	69
San Antonio	1	12	0	52	4	0	0	6	0	0	67
Montana:											
Billings	0	---	0	0	0	0	0	0	0	0	12
Great Falls	0	---	0	1	0	0	0	0	0	0	9
Helena	0	---	0	0	0	2	0	0	0	0	5
Missoula	0	---	0	0	0	0	0	0	0	6	7
Idaho:											
Boise	---	---	---	---	---	---	---	---	---	---	---
Colorado:											
Colorado Springs	0	---	0	0	5	3	0	1	0	1	12
Denver	4	---	0	4	2	8	0	0	0	4	79
Pueblo	0	---	0	1	1	2	0	0	0	0	15
New Mexico:											
Albuquerque	0	---	0	0	4	1	0	2	0	2	16
Utah:											
Salt Lake City	1	---	0	20	4	5	0	2	0	30	35
Washington:											
Seattle	0	---	0	17	3	4	0	5	1	2	83
Spokane	0	1	1	2	1	7	0	0	0	1	27
Tacoma	0	---	0	224	0	2	0	0	0	0	26
Oregon:											
Portland	0	1	0	6	1	2	0	2	0	5	82
Salem	0	---	---	4	---	0	0	---	0	0	---
California:											
Los Angeles	3	12	0	5	13	36	0	21	2	14	345
Sacramento	1	---	1	0	2	1	0	0	1	0	28
San Francisco	0	1	0	3	5	14	0	12	1	18	187

City reports for week ended Dec. 16, 1939—Continued

State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths	
Rhode Island:			
Providence	1	0	0
New York:			
New York	2	1	2
New Jersey:			
Newark	1	0	0
Pennsylvania:			
Philadelphia	0	0	1
Pittsburgh	1	0	1
Ohio:			
Cleveland	0	0	1
Columbus	0	1	0
Michigan:			
Detroit	0	0	1
Iowa:			
Des Moines	0	0	1
Louisiana:			
Shreveport	0	1	0
Texas:			
Galveston	0	1	0
Colorado:			
Colorado Springs	0	0	1
Denver	0	0	1
Pueblo	1	0	0
Oregon:			
Portland	1	1	0
California:			
Los Angeles	1	0	1
San Francisco	0	1	3

Encephalitis, epidemic or lethargic.—Cases: Pawtucket, 1; Indianapolis, 1; Wheeling, 1.

Pellagra.—Cases: Charleston, S. C., 3; Miami, 1; Little Rock, 1.

Typhus fever.—Cases: Atlanta, 1; Savannah, 1; Nashville, 4; Mobile, 1; Montgomery, 1; Dallas, 2.—Deaths: Nashville, 1; Mobile, 1; Dallas, 1.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended December 2, 1939.—During the week ended December 2, 1939, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1		1						2
Chickenpox	12	12	8	249	457	84	40	31	81	974
Diphtheria		1	2	22	1	12	5	1	1	45
Dysentery				2						2
Influenza		55			4	1			3	63
Lethargic encephalitis						1				1
Measles			2	132	296	15	4	5	25	479
Mumps				59	152	8			8	227
Pneumonia	1	10			26	1			5	43
Poliomyelitis					2					2
Scarlet fever	24	9	29	121	206	18	6	38	23	474
Tuberculosis		1	10	71	37	25	13			157
Typhoid and paratyphoid fever			1	10	6	1	4	1	1	24
Whooping cough		37		106	79	39	37	12	8	318

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—A cumulative table giving current information regarding the world prevalence of quarantinable diseases for a 6-month period appeared in the PUBLIC HEALTH REPORTS of December 29, 1939, pages 2319–2333. A cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau area.—A rat found on December 6, and one found on December 8, 1939, in Paauhau area, Hamakua District, Island of Hawaii, T. H., have been proved positive for plague.

Typhus Fever

Mexico—Tampico.—During the week ended December 9, 1939, one case of typhus fever was reported in Tampico, Mexico.

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